The
CHEMIST AND DRUGGIST

Established 1859 28 Essex Street, Strand, London, W.C.2 *Registered as a Newspaper*

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VOL. CXXI.

JULY 21, 1934

Annual Subscription (with Diary) 20/-. *Single Copies* 9d.

Index to Advertisers, pp. 5 & 6.

KURBOIL TABLETS

A preparation consisting of Tin and Tin Oxide, for oral administration in the treatment of Boils

SHOWCARDS AS ILLUSTRATED FREE FOR WINDOW DISPLAY

Tubes of 50 cartoned, packed in one dozen show outers, per **7/6** dozen

RETAIL **1/3** TUBE

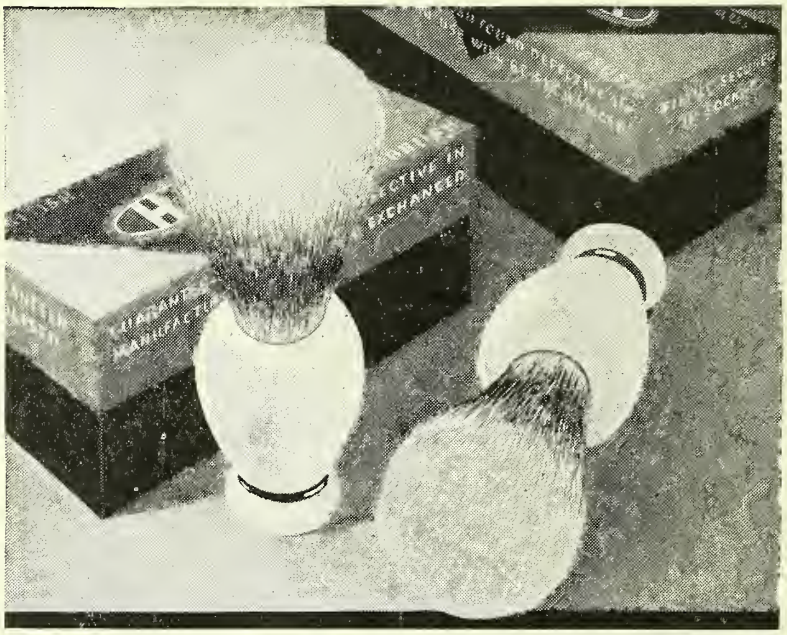
ARTHUR H. COX & Co. Ltd

Manufacturing Chemists

BRIGHTON

A A

TWO MORE OF THE HALEX FAMILY!



WHY IT PAYS TO SELL HALEX SHAVING BRUSHES

Halex Tooth Brushes and Halex Dental Plate Brushes have been good sellers for years. You know that from experience!

Halex Shaving Brushes are good sellers, too. See that you have them in stock—like the other Halex Toilet Brushes they are being advertised in the leading national newspapers.

PURE BADGER to sell at **15/-** Red Ring.

PURE STAINED HOG to sell at **5/-** Blue Ring.

1. Knot bound with silver wire.
2. They positively don't come out.
3. Handy, well balanced handles.
4. Free from crevices where soap could collect.
5. Attractively boxed.
6. Generous profit.
7. And the public has a warm corner for a brush named "Halex."

HALEX

Bristles don't come out

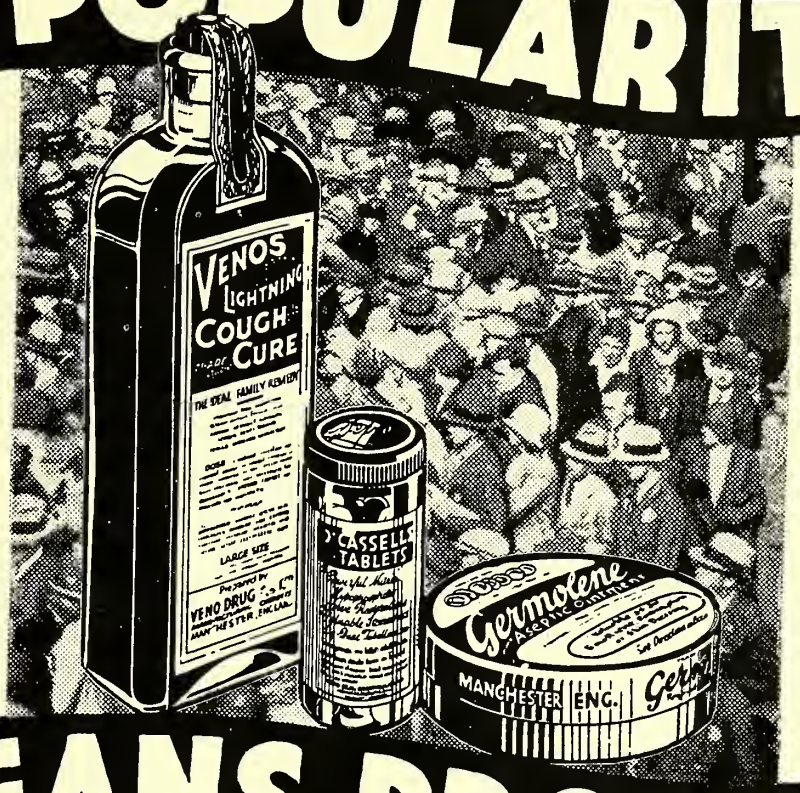
BRITISH XYLONITE CO LTD · HALE END · LONDON E.4

INDEX TO ADVERTISERS

[Continued overleaf.

INDEX—cont.

POPULARITY



MEANS PROFITS!

The one and only question when considering what to stock, is will it SELL? Not for a day . . . not for a week . . . but *consistently*, year in and year out. That is the only basis for really profitable business. On popularity depend your profits.

The three Veno Products are the most *dependable* sellers on the market. 'Dead' stock is non-existent; the demand for Germolene Brand Ointment, Dr. Cassells Brand Tablets and Venos Brand Lightning Cough Cure is nation-wide. These products have been proved over decades; each is the leader in its class. Profits are considerable, and you will never be faced with the problem of falling demand.

Advertising in a greatly increased list of publications is now appearing. Sales are due for a further rise. Don't delay. Time is money. Write to-day for terms and attractive display material.

PHENSIC

Phensic is the quickest Pain-Killer known. It is not a seasonal line—it sells consistently all the year round. A new forceful series of advertisements is now appearing in all the most popular media. Phensic will pull in big profits for YOU. Write for stocks to the agents—VENO DRUG CO., LTD.

VENO DRUG CO. LTD.

CHESTER ROAD, MANCHESTER, 16

ARMOUR'S FLAVOURED JUNKET

A NEW PREPARATION TO CREATE NEW SALES

EASY TO PREPARE

A DELICIOUS

SWEETENED AND

FLAVOURED JUNKET

FOR THE SICKROOM

NURSERY & TABLE

•

ADD CONTENTS TO

A PINT OF WARM

MILK — STIR GENTLY

AND ALLOW TO COOL

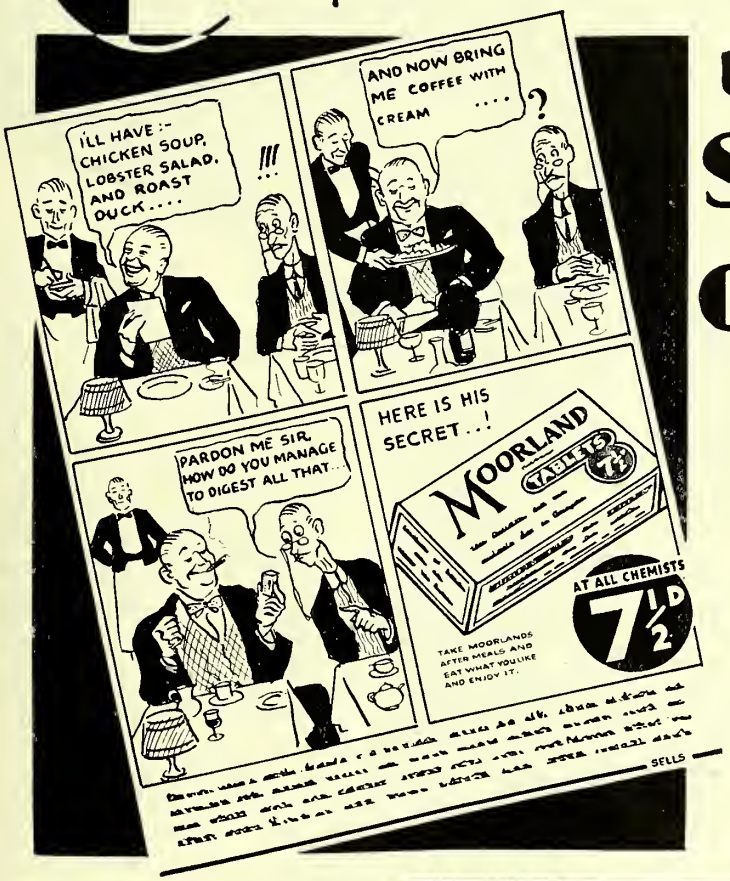
ARMOUR & COMPANY LTD.

LABORATORY DEPT., ARMOUR HOUSE, ST. MARTINS-le-GRAND, LONDON, E.C.1

TELEGRAMS: "ARMOSATA-CENT," LONDON

TELEPHONE: - - NATIONAL 2424

Capitalise this Summer Campaign by



KEEPING MOORLANDS WELL DISPLAYED

New advertising to suit the holiday season in the right holiday media—Daily Sketch, Daily Mirror, Illustrated Weeklies and Monthlies. Due to the cumulative effect of constant recommendation and consistent advertising, Moorlands are in greater demand than ever. Moreover no other 7½d. nationally advertised article sells in such quantity as Moorlands and yields anything approaching the same percentage of profit.

It pays to display Moorlands

THE PUBLIC WILL HAVE

MOORLAND BRAND INDIGESTION TABLETS

W. B. CARTWRIGHT, LTD., Rawdon, Leeds.

PHOSFERINE PREPARATIONS!

A NEW LINE!

PHOSFERINE TONIC WINE

A VERY pleasant medicated Wine of highest quality, which contains generous blood enriching, nerve vitalising elements, with the carefully balanced addition of Phosferine, suitably adjusted to the average constitution.

A leading London Analyst *writes:*

"I find Phosferine Tonic Wine to be made from a sound, full-bodied wine of excellent quality. It is free from acidity and all objectionable secondary products of fermentation. The very pleasant flavour imparted to the Wine by Phosferine improves the 'bouquet,' and provides a most delightful beverage."

Phosferine Tonic Wine is supremely beneficial in promoting splendid recovery after Influenza or other illnesses, as it builds up permanent vitality with the strengthened circulation of new rich blood.

Sells at 3/9 per large bottle. Trade price 32/6 per dozen, less 2½% 14 days.

WINE LICENCE REQUIRED

Orders should be forwarded to the Distributors, L. ROSE & CO., 89, Worship St., E.C.2

PHOSFERINE (ASHTON & PARSONS) LTD., LUDGATE HILL, LONDON, E.C.4

OUR ADVERTISING CAMPAIGN WILL CREATE A BIGGER DEMAND THAN EVER

Get ready to enjoy your share in the profits from Julysia's great sales drive. Generous terms ensure you good profit on every sale, while Julysia's superior quality guarantees constant "repeats."

IS PACKED IN THREE SIZES

6d. size @ 4/- dozen 1/- size @ 8/- dozen
1/6 size @ 12/- dozen

BONUS TERMS:

Thirteen bottles to the dozen for 1/- and 1/6 sizes only.

Special Carriage-Paid Parcels ON BONUS TERMS:

No. 1 PARCEL. 4 dozen 1/- size.
With FREE BONUS of 4 x 1/- bottles.

No. 2 PARCEL. 3 dozen 1/- size 1 dozen 1/6 size.
With FREE BONUS of 3 x 1/- and 1 x 1/6 bottles

A product of Jules Freres, Ltd.,
Perfumers, 154-164 Walworth Rd., S.E.17

BEAUTIFUL AND ATTRACTIVE SHOWCARDS

Thousands of Pounds are being Spent — but

unless you display you can't expect to participate...

We are spending thousands of pounds in a few short weeks on the most intensive campaign of any Chemist's proprietary for this Season of the year.

This must bring you profits.

Will you please co-operate by prominently displaying Potter & Moore's Lavender and Potter & Moore's Powder-Cream before your customers.

If you are short of material please write at once to the address below.

Don't forget your profit is good, and you are protected under the P.A.T.A.

The above is a facsimile reproduction of one of the large space adverts. appearing continuously in the "Daily Mail," "Daily Mirror," "Daily Sketch," "Sunday Pictorial," etc., etc.

Potter & Moore's
Original Mitcham
LAVENDER

POTTER & MOORE, LTD., LAVENDER HOUSE—DALSTON—LONDON, E. 8

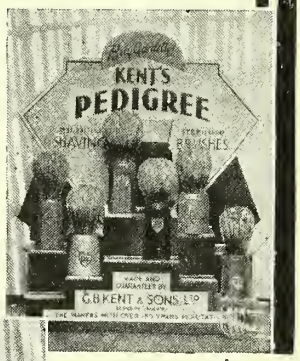
KENT

"PEDIGREE" BRUSHES

"PEDIGREE" SHAVING BRUSHES

Selling price to public :—
"POPULAR" 4/9, 6/9, 8/9
"STANDARD" 6/9, 12/9, 15/9

In white and coloured handles packed in transparent container as illustrated.



"PEDIGREE" TOOTH BRUSHES

Pure Bristle. Range of twelve in coloured and bone handles. Attractive Display Stand supplied.

Selling price to public :—

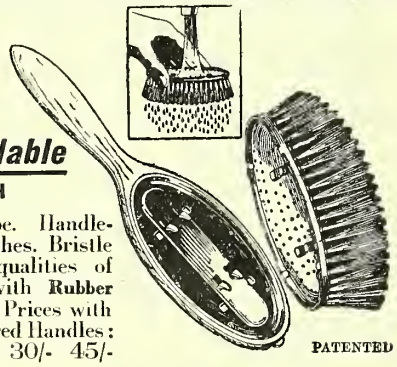
9d.	1/-	1/3
1/6	1/9	2/-

KENT-COSBY

Hygienic Refillable

HAIRBRUSH

Also in Military Shape. Handlebacks in various finishes. Bristle Refills in various qualities of pure bristle, also with **Rubber Cushion Base.** Retail Prices with Satin Finish or Coloured Handles: 7/11, 12/6, 18/6, 30/- 45/-



PATENTED

ATTRACTIVE MODERN LINES SHOWING GOOD PROFITS

Ordinary standard lines in Best British Hair, Tooth, Nail, Shaving, Bath Brushes, etc., obtainable as usual on same terms at same prices.

WRITE FOR FURTHER PARTICULARS, TRADE TERMS AND SAMPLES.

G. B. KENT & SONS Ltd.
75 FARRINGDON ROAD
LONDON E.C.1

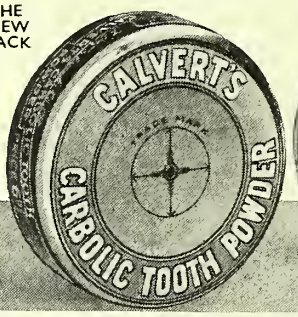
MAKERS OF BEST BRITISH BRUSHES SINCE 1777

CALVERTS NEW TINS

The new improved shape 6d. size—wider and flatter—allows the tooth brush to pick up the last piece of powder easily.

- **IMPROVED MODERN PACK** makes Calverts easier and more economical to use, more attractive to display.
- **STRIKING NATIONAL ADVERTISING** is driving home the advantages of Calverts, recruiting new users every week.

THE NEW PACK



THE OLD PACK

Stock Carnos RAZOR BLADES for quick sales!

12 for 6d.

Write for details to :

Blade Industries Ltd., Dept. 60, Trading Estate, Slough, Bucks.

NATIONALLY ADVERTISED

Malt Extract of proven dietetic value

Reduced facsimile

'KEPLER' MALT EXTRACT is submitted to biological tests to confirm B vitamins content

Contains, in addition to B vitamins, maltose, dextrin and diastase

A valuable addition to the diet of nursing mothers and bottle-fed babies

Regularly prescribed for its high nutritive value

'KEPLER'

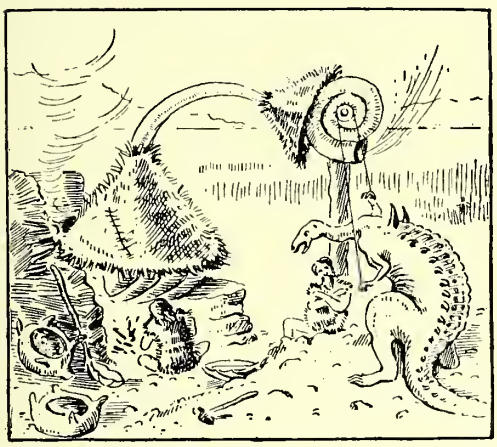
TRADE MARK

MALT EXTRACT

London Prices to the Trade:
24/6 per doz. bottles and
43/6 per doz. bottles (subject)

A palatable vehicle for unpleasant or readily oxidisable medicaments

For list of combinations, see
BURROUGHS WELLCOME & CO. PRICE LIST



MANUFACTURE OF MALT EXTRACT IN VACUO

F.R.

A humorous artist's impression of an imaginary incident in ancient pharmacy.

Please Note . .

CHANGE OF TELEPHONE NUMBER to

CENTRAL 4000

BURROUGHS WELLCOME & CO., LONDON

G 1813

THE
CHEMIST AND DRUGGIST
A Weekly Journal of Pharmacy, the Drug, Chemical and Allied Trades

The official organ of The Pharmaceutical Society of Ireland, The Pharmaceutical Society of Northern Ireland, The Chemists' and Druggists' Society of Ireland, and of other Chemists' Societies in Overseas Dominions

CONFERENCE NUMBER, 1934

PUBLISHED AT

28 ESSEX STREET, STRAND, LONDON, W.C.2

Telegrams: "Chemicus, Estrand, London" *Telephone: Central* 6565 (8 *lines*)

BRANCH OFFICES

4 CANNON STREET, MANCHESTER (TEL.: BLACKFRIARS 3052) 54 FOSTER'S BUILDINGS, HIGH STREET, SHEFFIELD (TEL.: 22458)
19 WATERLOO STREET, GLASGOW (TEL.: CENTRAL 2329) 372 FLINDERS LANE, MELBOURNE, AUSTRALIA
155 AVENUE DE WAGRAM, PARIS, XVII^{e} (TEL.: ETOILE 19-79)

VOL. 121. NO. 2841 JULY 21, 1934

CONTENTS

News of the Week

Contracts

The following tenders have been accepted by the bodies named:—

Dover Town Council.—Mr. J. Weir, chemist and druggist, drugs and sundries.

Lichfield City Council.—Boots, Ltd., drugs.

Inquests

In Pimlico, London, S.W.1, Mrs. Olga Wallace, Warwick Street, died after drinking a perfume reported to be lavender water. The verdict was "Death from alcoholism."

At Horwich, Bolton, on July 11, an inquest was held on the body of Mr. H. S. Phillips, Ph.C., who was found dead in a field at Rivington. Evidence was given of the finding of a bottle labelled "hydrocyanic acid—poison" near the body and that it had been purchased in Manchester. A verdict of "Suicide while of unsound mind" was recorded.

At Lewisham, London, S.E., on July 6, an inquiry was held into the circumstances attending the death of a woman, and of a man with whom she had associated. Dr. A. Davies, pathologist, said as the result of analysis he had no doubt the woman died from administration of hydrocyanic acid, which might have been taken as potassium cyanide. The man had died from similar poisoning. The Coroner: As regards cyanide of potassium, would it be difficult for a woman to go into a chemist's and get it? Dr. Davies: I am not certain of that, because these substances are used in photography. At the same time, he added, its purchase was so well covered by legislation that it would be difficult to obtain. Police evidence was given to the effect that at the man's place of business he would have access to large quantites of cyanide, as it was used there for plating purposes. The jury found that the man had murdered the woman by administering poison and that he had committed suicide.

Birmingham

Measles is prevalent amongst school children at the present time.

It is reported that the bookings of space by exhibitors at the Birmingham Section of the British Industries Fair are far in advance of those which had been taken at this time last year.

According to a recent visitor to the Midlands, most local pharmacists, judging from their brown and happy faces, seem to have been on holiday and returned benefited. Several have favoured North Wales or the lakes, others have chosen South Wales, Cornwall, Devon.

Liverpool

Mr. William Parry, chemist and druggist, now in his ninetieth year, has gone on holiday to Cilcain, North Wales.

An interesting souvenir booklet on the new Mersey Tunnel has been issued by Paton, Calvert & Co., Ltd., Liverpool.

Miss Norah A. Meyrick, daughter of Mr. H. C. Meyrick, chemist and druggist, was among the successful

candidates for the B.Sc. degree at the recent Liverpool University examinations.

Mr. Parkin S. Booth, of the Association of Manufacturing Chemists, Ltd., was the winner of the Diamond Jubilee Cup and gold memento at the recent summer meeting of the Leasowe Golf Club with a score of 88—16=72.

Two spools of film for the price of one was the offer of a Liverpool store the other day. The films were tied in pairs and were marked "salvage stock" or "for export." It appears that they had been stored in a building damaged by fire.

The branch of Harold Lomax, Ltd., at Tarleton Street, Church Street, where an attractive window had recently been dressed in collaboration with the Cunard and White Star shipping companies, was subjected to a smash-and-grab raid on July 15. The articles taken were mostly toilet preparations.

Manchester

Many Manchester chemists learned with sincere regret of the death of Mr. Horace S. Phillips (see p. 79).

Councillor R. G. Edwards, Ph.C., chairman of the Public Health Committee, was presented to the King on July 17, when His Majesty opened the New Central Library and laid the foundation stone of the Town Hall Extension. Councillor Edwards is also a member of the Libraries Committee.

The Medical Officer of Health, in a report to the Public Health Committee, on July 17, stated that the City Council should realise definitely that the department cannot continue to be conducted efficiently unless the requested additions to the staff are made. He recommends that two assistant medical officers be added to the staff and that in view of the need of experienced and capable men the salaries attached to the posts should be £1,000 per annum each.

Miscellaneous

DANGEROUS DRUGS.—At Bow Street Police Court, London, recently, William Postels and Oscar Frederick Janke were fined £25 for unauthorised possession of dangerous drugs.

WINDOW DRESSING AWARD.—At the recent Dolgelley Rose Queen Day Festival R. & G. & Wynne Williams, chemists, were awarded the first prize in the window dressing competition—"Things to use" section.

LONG SERVICE AWARD.—Mr. C. F. Jeffries, head of the ledger department at the London offices of Burroughs Wellcome & Co., has been presented with an oak bureau bookcase on completion of twenty-one years' service.

BURGLARIES.—The premises of Timothy White, Ltd., chemists, Weybridge, were broken into recently and a sum of money stolen.—The Stafford branch of Boots, Ltd., was recently raided by burglars, who decamped with a sum of money and toilet articles.

DEATH IN A SHOP.—Mr. A. G. Allan, a Bank of England clerk, aged fifty-nine, collapsed and died recently in a branch of Boots, Ltd., in Upper Richmond Road, East Sheen. Evidence was given at the inquest by Mr. Percy Gunner, chemist and druggist, manager of the branch. Medical evidence showed a history of cerebral hæmorrhage and alcoholic poisoning, and a verdict was recorded correspondingly.

IN THE COURTS.—At Burnley Police Court, on July 6, Jonathan Crook (42), unemployed, was sentenced to six months' imprisonment for obtaining money by false pretences. It was stated that the accused called at the shop of Mr. Eric Ingham, chemist and druggist, Brougham Street, with a prescription. He told Mr. Ingham he could buy boots and shirts cheaply, and Mr. Ingham gave him the money for a small supply.—At North London Police Court, recently, David Berman, Lauriston Road, was fined £10, with £3 3s. costs, for selling as malt vinegar a liquid which contained 10 parts of malt vinegar and 90 parts of wood vinegar.

EXPRESS PARCELS SERVICE DISCONTINUED.—The London Passenger Transport Board announce that owing to the exigencies of the passenger traffic they have decided to discontinue the Metro Express Parcels Service, and will cease to deal with unaccompanied parcels traffic at all stations on the Metropolitan line. The Great Western, London & North Eastern, London, Midland & Scottish and Southern Railway companies have undertaken to conduct the parcels business referred to. The Board have arranged that the following Metropolitan line stations will continue for a limited period to be open for the acceptance of parcels for delivery by the railway companies named:—St. Mary's (Whitechapel), Aldgate, Moorgate, Aldersgate and Barbican, Farringdon and High Holborn, Baker Street, Willesden Green.

Irish Notes

Brevities

Boileau & Boyd, Ltd., Dublin, recently secured the contract for drugs and medicines to the Department of Defence: Fannin & Co., Ltd., Dublin, secured the contract for the supply of surgical goods.

Sympathy has been extended by many pharmacists in Cork and Kerry to Mr. Eugene MacSweeney, M.P.S.I., Cork, on the recent bereavement he sustained in the death of his brother, Dr. William MacSweeney, Killarney.

At Gortin Petty Sessions on July 13, Peter McCullagh, Plumbridge, was prosecuted for selling ginger wine which was not of the nature, substance, and quality demanded. The Food and Drugs inspector said the analyst's report showed that the ginger wine was a cordial containing colouring matter, syrup and water. The chairman said the analyst did not say what it should contain. He dismissed the case and awarded 20s. costs against Tyrone County Council.

Owing to the clashing of the British Pharmaceutical Conference at Leeds with the date of the monthly meeting of the Council of the Pharmaceutical Society of Northern Ireland the July meeting of the Council will not be held until July 27. A number of members of the Council have gone over to the Conference, including Mr. Fred Storey, Mr. Samuel Gibson, Mr. H. F. Moore, Mr. W. Martin, and the Secretary, Mr. D. L. Kirkpatrick. Mr. John Maxwell, Londonderry, who has been indisposed for some time, hopes to be present during at least part of the proceedings.

Evidence regarding the Irish Free State Laboratory, which was formed in 1924 and has now a staff of eleven analytical chemists, was given at a sitting in Dublin, on June 15, of the Free State Civil Service Commission. In a statement by the State Chemist (Mr. T. J. Nolan) it was pointed out that during the year ended March 1931 40,283 samples were examined. In the last three years the work had become considerably greater, each Finance Act passed increasing it by at least 50 per cent. A witness said one great difficulty with which the Department was faced was that once a Revenue Act was passed every manufacturer tried to get round it, which meant that a great many samples had to be examined. The salary for a married Class 1 chemist was £225, rising to £400, and of unmarried £200 to £300. It was added that much of the work of the Laboratory for the Revenue Commissioners was connected with the assessment of duty on soap, spirits, table waters and other commodities.

Belfast

The pharmacies of Belfast and Northern Ireland generally were closed on July 12 and 13, except for the sale of urgent medicines, the occasion being the annual industrial holidays.

At the Queen's University, Belfast, graduation ceremony on July 10 the degree of bachelor of medicine, bachelor of surgery, and bachelor of obstetrics was conferred upon Mr. Samuel Porter, Ph.C., The Oriel Pharmacy, 363 Ormeau Road, Belfast. It is an interesting fact that the previous occupants of this pharmacy also became doctors—Dr. W. E. Rutledge, who is now practising in England, and his predecessor, Dr. T. Kennedy, now practising in University Square, Belfast.

Scottish Notes

Brevities

Mr. Robert M. S. Pollock, chemist and druggist, has opened a pharmacy at 368 Amulree Street, Sandyhills, Glasgow.

Miss E. P. Fenton, daughter of Mr. Peter Fenton, chemist and druggist, Coatbridge, has been awarded the second prize in visual optics (second year) at the Glasgow Refraction Hospital.

A letter posted in Galashiels district and addressed to: "Mr. Chemist, who relieved a sparrow whose feet had got clogged with tar, Buckie," was delivered recently to Mr. E. Fraser, chemist and druggist.

A motion by the Public Health Committee of Edinburgh Town Council, recommending the appointment of an assistant dispenser at a salary of £2 a week, with lunch, was severely criticised by Labour members at a recent meeting. One member said they were going to pay this assistant much less than a scavenger. The Committee's recommendation was carried.

Edinburgh Chemists' Golf Club held a competition over Ratho Park course on July 11. Play resulted as follows:—(1) (captain's prize) J. Bowman (12) =72; (2 and 3) (a tie) W. Herd (7) and R. C. MacGregor (11) = 73. The winner of Edinburgh Chemists' Golf Trophy (handicaps 15 and over) was H. G. Glass with 75 and 74=149.

The photograph published below of members of the bowling section of Glasgow Pharmacy Club was taken at Burnbank, recently, and includes Messrs. D. Black,

D. M. Dick, A. W. Calder (president), G. Jarvie, F. B. Gray, J. S. Anderson, D. J. Edgar, and (seated) W. Seivwright.

Topical Reflections

By Xrayser

As a Pharmacist,

endowed with a modicum of common sense, I endorse the conclusions arrived at in your editorial article (*C. & D.*, July 14, p. 37). Part I of the Pharmacy and Poisons Act, 1933, Section 4, makes it quite clear that unless a person on the Register pays his fee "within two months after the date on which the demand therefor was made," the Council of the Pharmaceutical Society may remove his name from the Register. What is to be done about it? We have been told already that 3,400 names have been removed from the Register. This, I believe, is but a beginning; the number will probably be increased considerably next year. Many non-practising pharmacists have, I gather, this year paid their subscription to the Society, who will not continue to do so. They did not quite understand what the situation was; numbers of these will not renew, for there is little in return for the guinea and a half they have to pay. What the number is of those, still members of the Society, who are not engaged in retail business it is difficult to discover; that it must be considerable is evident from the fact that practically all the wholesale drug houses have several pharmacists on their staffs, either as representatives on the road, or indoors; I am acquainted with one such house the staff of which includes seventy qualified men. It is true that Part I, Section 3, gives power to the Society to prescribe different retention fees for different classes of members, and it may well be that a small retention fee for non-practising pharmacists may yet be decided upon; I favour, however, the inclusion of all pharmacists in the Register with a star or other mark indicating that they are not "keeping open shop." For these there should be no fee. It may be necessary yet to form an association of non-practising pharmacists, to conserve the rights of its members.

The Proposed Rules

for practical training, which it is suggested shall be added to the official Articles of Pupilage (p. 52) will, if carried out, act as a most efficient check upon the number of apprentices entering pharmacy—although, I take it, this was not the intention of the Syllabus Committee when the rules were being discussed. From a knowledge of practical pharmacy extending over nearly half a century, including the training of several apprentices, I can say that the number of pharmacies in the country where the practical experience required can be given is small. It must be remembered that not every pharmacist wants the bother of an apprentice, and this is often the case in businesses where just the experience implied in the proposed rules is to be obtained. Presumably some consideration will yet be given to these rules, and the association may yet have a voice in the matter; but unless they are modified so as to bring them into line with pharmacy as it is to-day, instead of with a pharmacy which, I am afraid, exists only in the minds of some members of the Syllabus Committee, they will be found unworkable.

Another Aspect

of the new situation may be that pharmacists who, in the past, have taken apprentices and who are in the position to give them the necessary training, will ask from parents and guardians a lump sum down as premium; or if they have been in the habit of asking such in the past, they will want a larger amount. Of late years premiums in one sum have been going out of fashion, and the master has often actually paid the apprentice a small weekly sum as pocket money; I cannot imagine that this practice will continue. I am not at all sure that the training of a pupil in the laboratory of a wholesale house is going to be for the benefit of retail pharmacy in the long run. Such pupils get a manufacturing experience which is not at all suitable for retail business, and at the end of their training they have no knowledge whatever of retail conditions. Unless at the end of their time they can get further experience in the wholesale, they have to enter the retail almost as strangers. A similar state of affairs exists when the pupil, who has spent his apprenticeship in the dispensary and manufacturing laboratory of a hospital, is out of his or her time, except that in this case a knowledge of dispensing has been acquired. I hope that these proposed rules will yet be discussed in detail by the associations; they are much too drastic to be allowed to pass without comment or protest.

Legal Reports

Appeal Against Trade-Mark Registration.—In the Chancery Division of the High Court, London, on July 13, Mr. Justice Luxmoore began the hearing of an appeal by J. C. Eno, Ltd., Piccadilly, W.1, against a decision of the Comptroller-General allowing the registration by Evans Sons Lescher & Webb, Ltd., Hanover Street, Liverpool, of a trade mark consisting of a label on which there was a fruit device and the legends "Fru-Tu-San" and "Salina de Frutas." Mr. J. Whitehead, K.C., and Mr. Heald appeared for the appellants, and Mr. Griffiths for the respondent applicants. The grounds of the opposition, said Mr. Whitehead, were that the words "Fruit Salt," "Eno's Fruit Salt" and their equivalents in foreign languages were well known throughout the world as denoting goods of the opponents, who for many years had been the registered proprietors in Great Britain and many foreign countries of marks covering the use of such words, translations and variations thereof. In these countries, they said "Fruit Salt" and "Sal de Fruta" were well known as denoting their manufacture, which was also sometimes known as "Sal Eno." In the past the applicants had sold their preparations abroad under the names "Salina Effervescente de Evans" and "Evans' Effervescent Saline" without objection by Messrs. Eno. It was alleged that the use of the proposed mark was calculated, whether intentionally or not, to attract a considerable proportion of Messrs. Eno's goodwill in Latin and Latin America countries. They said the words "Salina de Frutas" had never been common to the trade in Latin countries, and their use would cause confusion and damage to them. The applicants admitted that the words "Eno's Fruit Salt" and their foreign equivalents were distinctive of Messrs. Eno's goods, but they denied that in any country the words "Fruit Salt" denoted the manufacture of the opponents. These words, they said, had always been descriptive of an effervescent saline preparation, and had been used throughout the world for many years by manufacturers, traders and the public. The opponents had always used them in conjunction with the name Eno, which was their true distinguishing mark. The applicants further said that they had used a mark not substantially different from the one now registered since 1927, and they said the latter was not calculated to injure the opponent's goodwill. The hearing was adjourned.

New Companies and Company News

P.C. means Private Company and R.O. Registered Office

Bath Road Pharmacy, Ltd. (P.C.).—Capital £200. Objects: To carry on the business of chemists and druggists, etc. R.O.: 24 Bath Road, Hounslow.

Putridomors Company, Ltd. (P.C.).—Capital £100. Objects: To carry on the business of dealers in dental goods, manufacturers and distributors of dental goods of all kinds, etc. Solicitors: S. Sebba, 7/8 Great Winchester Street, E.C.2.

Asprees Laboratories Company, Ltd. (P.C.).—Capital £100. Objects: To carry on the business of manufacturers of and dealers in pharmaceutical and medicinal preparations, drugs, chemicals, oils, etc. R.O.: Boundary House, Turnford, Hoddesdon, Herts.

Haines & Sherman, Ltd. (P.C.).—Capital £100. Objects: To carry on the business of manufacturers, importers and exporters of and dealers in rubber of all kinds, rubber substitutes, chemicals, gutta percha, etc. R.O.: 34A Kingsland Road, Shoreditch, E.2.

Oil & Colour Manufacturing Co., Ltd. (P.C.).—Capital £100. Objects: To carry on the business of manufacturing chemists, oil and colour grinders, importers and exporters of and dealers in chemicals, soaps, paints, etc. R.O.: 1, 3 and 5 Moorfields, E.C.2.

Medical Centre (London), Ltd. (P.C.).—Capital £100. Objects: To carry on the business of manufacturers of and dealers in surgical, medical, ophthalmic, dental and veterinary instruments and equipment, etc. R.O.: 13 Alexandra Gardens, Hounslow, Middlesex.

English Glory (1934), Ltd. (P.C.).—Capital £100. Objects: To adopt an agreement with Norman H. Trapp, and to carry on the business of manufacturers of and dealers in hair tonics, dyes, soaps, perfumes, toilet preparations and requisites, etc. R.O.: 38 Walbrook, E.C.4.

Jordan & Sons, Ltd., company registration agents, Chancery Lane, W.C.2, report that, during the period January-June, 1934, under the class "chemicals" there was registered three public companies with a total capital of £236,000, and 294 private companies with a capital of £847,100, making a combined total of 297 companies registered with a capital of £1,083,100. During the same period of 1933, 303 companies were registered with a total capital of £823,050.

Private Arrangements

P. O. Mandeville, trading as the Castle Pharmacy, 30 Newington Butts, London, S.E.1. The creditors were called together recently, when it was reported that the liabilities were £244 11s. 11d., of which £144 11s. 11d. was due to the trade and £100 to the debtor's father for cash advanced. The assets totalled £42 18s. 6d. After allowing £2 for preferential claims, the net assets were £40 18s. 6d., or a deficiency of £203 13s. 5d. An offer was made of a composition of 6s. 8d. in the £, payable in cash, which it was decided should be accepted.

George Henry Wragg, trading as George Wragg & Son, 60 Lambert Street, Sheffield, wholesale druggist. At the meeting of the creditors the statement of affairs showing ranking liabilities of £470 15s. 8d. The assets totalled £130. After allowing £33 15s. 8d. for preferential claims, the net assets were £96 4s. 4d., or a deficiency of £374 11s. 4d. It was reported that the debtor took over the business on the death of his father some considerable time ago. The position was attributed to lack of capital. An offer was submitted of a composition of 6s. 8d. in the £, payable in cash, which it was decided should be accepted.

Bankruptcy Reports

Re Charles William Cross, 70 Newland, Lincoln, chemist and druggist. The first meeting of creditors was held recently at the Official Receiver's Office, Lincoln. It was stated that the gross liabilities amounted to £1,039 11s. 9d., of which £938 13s. 6d. was expected to rank for dividend, and there were net assets of £59 10s. 11d., leaving a deficiency of £879 2s. 7d.

Re Arthur Hilton, 66 Higher Bridge Street, Bolton, Lancs, chemist and druggist. The first meeting of the creditors herein was held recently at the Official Receiver's Offices, Byrom Street, Manchester, when it was stated that debtor had not lodged a full statement of affairs, but he estimated his liabilities at £336, with assets of £73. The case, being a summary one, was left in the hands of the Official Receiver as trustee.

Re Thomas William Goddard, 32 Warwick Street, Barrow-in-Furness, chemist and druggist. The application for discharge herein was heard recently at Barrow-in-Furness. The Official Receiver said that the receiving order was made on September 29, 1930. The ranking liabilities were estimated at £2,549, but proofs actually admitted amounted to £2,501. The assets, so far as they were not assigned to creditors wholly or partly secured, were estimated to produce £660, but they had only produced £283 15s. 3d. A first and final dividend of 4d. in the £ was paid on proofs for £2,501 11s. 11d. The discharge was granted, subject to six months' suspension.

Proprietary Articles Trade Association

Council Meeting

THE quarterly meeting of the Proprietary Articles Trade Association was held on July 12, the president, Mr. N. N. Armitage, in the chair.

MR. E. H. KIDGER

Before the commencement of business the president extended a welcome to Mr. E. H. Kidger, president of the P.A.T.A. of New South Wales, and chairman of the Proprietary Association of that country. Mr. Kidger, said the president, was an English pharmacist who had taken an active part in furthering the price-maintenance system in New South Wales, and the Council were delighted to have him with them on this occasion. Mr. Kenningham also referred to Mr. Kidger's active work for price protection, and to the assistance and kindness he had shown Mr. Kenningham during the latter's visit to Australia. Mr. Kidger said that in Australia the chemists were as appreciative as those in Great Britain of the benefits they received from the P.A.T.A.; they owed much to the genius of the late Sir William Glyn-Jones, and to the parent body in this country for its pioneer work. In New South Wales, where the price-maintenance system was very effective, part of their scheme was the enforcement of definite binding legal agreements, under which the retailer was in direct contractual relationship with the secretary of the Association, acting on behalf of the manufacturer members. Their Association did not hesitate, where the circumstances justified, in fining both retailers and wholesalers for breaches of the rules. In Australia the P.A.T.A. was operated on a State basis. While in New South Wales, where the organisation was exceedingly efficient, there was no "cutting" of price-protected articles, in South Australia, where there was no P.A.T.A., price-cutting was rampant. He appreciated the Council's kindness in extending their hospitality to him.

MR. W. O. MCBRYDE

The Council received and accepted the resignation of Mr. W. O. McBryde as a member of the Retail Section of the Council. It was decided that no steps be taken to fill the vacancy occasioned by Mr. McBryde's resignation until the annual election in December.

SUPPLIES TO PERSISTENT PRICE-CUTTERS

It was reported that the list of persistent price-cutters had been circulated to wholesale and manufacturer members, all of whom had agreed to withhold supplies of goods (both those which are on the Protected List and also non-P.A.T.A. goods) from these "cutters." Arrangements have been made for this list of price-cutters to be circulated to manufacturer and wholesale members quarterly as a reminder.

TERRITORIAL REPRESENTATION ON THE COUNCIL

It was reported that the Executive had remitted to the Retail section for consideration and report a recommendation from the Executive of the National Pharmaceutical Union that the Retail Section of the P.A.T.A. Council should be elected on a territorial basis, and an inquiry as to whether the P.A.T.A. would be prepared to consider the reorganising of the election on this basis. The Council endorsed the recommendation of the Retail Section and the Executive that no change be made in the existing procedure in regard to the election for the Retail Section of the Council.

EXPORT GOODS REACHING PRICE-CUTTERS

The Executive Committee reported that they had received disquieting evidence that there existed a considerable traffic in connection with the supply of P.A.T.A. goods to price-cutters through the medium of export transactions. This evidence showed that in some instances goods sent to the docks ostensibly for export had been removed before shipment, and that in other cases consignments had actually been shipped to foreign ports and re-shipped back to this country. The Council was satisfied that the exploitation of the export business had resulted in large supplies of P.A.T.A. proprietaries reaching price-cutters, who, owing to the activities of the Association, had been prevented from obtaining supplies through the usual subterranean channels in the home market. The Council would impress upon all P.A.T.A. manufacturers and their agents the importance of exercising the greatest possible care in regard to export orders, and of satisfying themselves that every order they execute for export is intended for a bona fide export customer, and for sale in the market to which it is consigned.

WRIGHT'S COAL TAR SOAP

The Executive Committee reported that they had been seriously concerned regarding the widespread price-cutting of Wright's Coal Tar Soap. In view of the fact that test purchases made by the Association showed that, almost without exception, price-cutters are in possession of and selling the new pack of the soap, and that Wright, Layman & Umney (1932), Ltd., found themselves unable to render the assistance necessary to prevent this price-cutting, the Committee recommended that notice be given to Messrs. Wright, Layman & Umney, that the Council propose, under Rule 38 of the Association's Rules, to remove Wright's Coal Tar from the Protected List, subject to the company's right under the Rules to appeal against this decision. This recommendation was approved and endorsed by the Council.

MIDDLESBROUGH PHARMACISTS' ASSOCIATION

The Council received the following resolution from the Middlesbrough and District Pharmacists' Association:—"We the Middlesbrough and District Pharmacists' Association (N.P.U. Branch 38) express our appreciation to the P.A.T.A. for the very competent manner in which they have seconded the efforts of this Association in its determination to eliminate price-cutting."

PRICE-MAINTENANCE WORK

The quarterly report on the Association's price-maintenance work contained many interesting features, and provided evidence that in many directions effective steps had been taken to trace and close the sources of supply to price-cutters.

DATES OF NEXT MEETINGS

It was agreed that the next meetings of the Council should be held on October 9, 10 and 11. This concluded the business of the meeting.

Westminster Wisdom

Notes on Parliamentary Matters

SPIRIT FOR MEDICAL AND SCIENTIFIC USE

In reply to a question put by Dr. Salter on July 16, the Financial Secretary to the Treasury (Mr. Cooper) stated that the quantity of spirits upon which rebate was paid under Section 4 of the Finance Act, 1918, as amended, during the year ended March 31, 1934, on the ground that the spirits were used in the manufacture or preparation of recognised medical preparations, or for scientific purposes, was 584,000 proof gallons. Information is not available as to the quantities used under the respective heads.

Pharmaceutical Society of Ireland

Council Meeting

THE monthly meeting of the Council of the Pharmaceutical Society of Ireland was held on July 10 at 67 Lower Mount Street, Dublin, the president (Mr. P. J. Fielding) in the chair. Other members of the Council present were Messrs. D. Warwick, F. J. Fitzpatrick, M. J. Parkes, J. A. O'Rourke, B. P. Hickey, C. J. Cremen, J. Gleeson, P. J. Cahill, D. W. P. Boyd, P. Brooke-Kelly, J. T. Dwyer, and Dr. Mitchell. At the outset of the proceedings the president welcomed Mr. Cahill as a new member of the Council. They were all glad, he said, to have young men of Mr. Cahill's standing on the Council, and believed he would prove a useful member.

Mrs. Farrington and family wrote thanking the Council for their kind expression of sympathy on the death of the late Mr. Andrew Farrington.

In connection with the Fairchild Scholarship examination Mr. H. Skinner, secretary to the Trustees, wrote: "Dear Mr. Kerr, the trustees of the Fairchild Scholarship and Prizes and Messrs. Fairchild Brothers & Foster very much appreciate the courtesy of the Pharmaceutical Society of Ireland in allowing accommodation to the candidates to sit for the above examination in Dublin centre, and I have pleasure in requesting you to convey thanks for this privilege." The letter was noted.

Miss A. Clarke, who submitted matriculation certificate, applied for and was granted preliminary registration.

CHANGES OF ADDRESSES

The following changes of address were notified:—

W. H. Roche, M.P.S.I., from 38 Fortfield Road, Rathmines, to 45 Fortfield Terrace, Rathmines; G. A. O'Donnell, M.P.S.I., from 46 Cabra Park, Dublin, to 107 Connaught Street, Dublin; T. S. Maher, M.P.S.I., from Dunning's Pharmacy, Killenaule, to 8 Lower Sheriff Street, Dublin; D. Stack, L.P.S.I., from Ballyhooly, co. Cork, to 39 Patrick Street, Fermoy; W. Kelly, L.P.S.I., from 27 Falls Road, Belfast, to c/o McAviney, Ltd., Woodhouse Street, Portadown; W. Keogh, L.P.S.I., from Dooley's, Portarlington, Leix, to 17 Westbourne Place, Cobh; J. H. Cronhelm, L.P.S.I., from 48 Belmont Road, Belfast, to 2 Kincora Avenue, Belfast; A. F. Maxwell, L.P.S.I., from 2 Myrtle Terrace, Derry, to Avondale Pharmacy, 2,000 Great North Road, Avondale, Auckland, N.Z.

REPORTS FROM COMMITTEES

Reports were submitted from the Law, House, Schools, Certificates and Declarations Committees and approved.

GIFT OF BOOKS

The following letter was read from Dr. Ashmore: "Dear Mr. Kerr, some time in the near future it may be possible to arrange to have a Students' Reading Room provided with its own library, as distinct from the present library. In the meantime the nucleus of such a scheme could be formed by placing such books as are available at the disposal of those students who are members of the herbarium. With this object in view I have pleasure in sending the following books, which I would suggest placing in the herbarium." Dr. Ashmore then gave a list of a number of books he presented.

On the motion of MR. FITZPATRICK, seconded by MR. BROOKE-KELLY, the best thanks of the Council was tendered to Dr. Ashmore for his generous donation to the Society.

REDUCED FEES

MR. FITZPATRICK moved the following motion standing in his name: "That on and after October 1, 1934, the fees for the courses in botany and materia medica be reduced to two guineas per session." Proposing the motion Mr. Fitzpatrick said: "Mr. President, I assure you I will be as brief as possible. From a business point of view most of the members of the Council will I am sure agree with me that we ought to be able to increase the number of our students, but decrease the fees. Examining the statistics of the Pharmacy Class, I find that 40 per cent. of our students do their materia medica elsewhere, and we might be able to rope in a good percentage of those. As you are aware, following Dr. Ashmore's resignation we have amalgamated the two classes botany and materia medica under Mr. Collins, and under the new arrangement effect a saving in salaries. We will be passing on some of that saving to our students by fixing the fees at two guineas." Mr. Fitzpatrick's motion was unanimously agreed to.

NEW MEMBER CO-OPTED

The Council then proceeded to co-opt a member in lieu of the late Mr. Andrew Farrington.

MR. O'ROURKE, proposing that Mr. John Kevin Whelehan, M.P.S.I., 38 Pearse Street, Mullingar, be co-opted, said that Mr. Whelehan was one of the younger generation of chemists who had always taken a very active interest in the affairs of the Society. He was a hard and enthusiastic worker, and his family had a long and honourable association with pharmacy. For that reason he believed Mr. Whelehan would be a valuable addition to the Council.

MR. HICKEY seconded the motion.

DR. MITCHELL, associating himself with the motion, said he had known the late Mr. Whelehan, Mr. Whelehan's father. They were a highly respected Westmeath family, and he was sure the son of such an esteemed father would prove an asset to the Council.

Mr. Whelehan was unanimously co-opted a member of the Council.

MEMBERSHIP

The following were elected members of the Society: Miss R. A. Carolan, Messrs. D. Daly, and J. Magnier.

The following were nominated for membership of the Society:—Mr. D. Stack, 39 Patrick Street, Fermoy, and Mr. F. Loughman, 23 Gladstone Street, Clonmel.

Summer Outings

Staff Outings

THE staff of Bradley & Bliss, Ltd., manufacturing chemists, Reading, journeyed to Folkestone on July 1, the occasion of the annual outing. On arrival the members dispersed to enjoy the various attractions, and later in the afternoon met again, when a high tea was provided. The weather was splendid and the party spent a most enjoyable day.

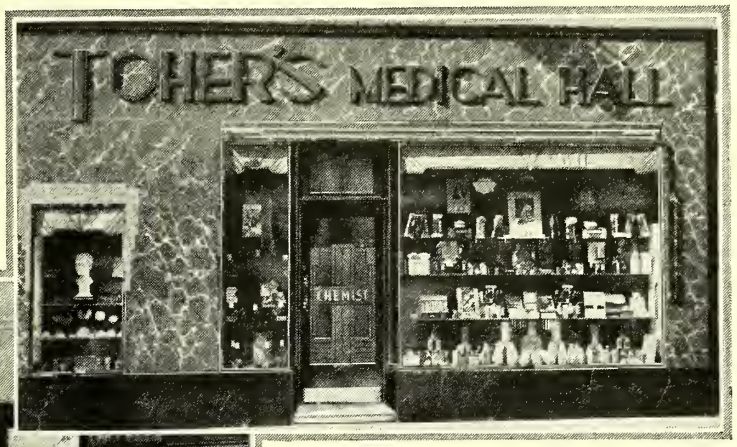
REDCAR and Saltburn had been chosen as the venue for the annual outing of the employees of Brook, Parker & Co., Ltd., manufacturing chemists, Bradford, which took place on July 14. Unfortunately the earlier part of the day was marred by incessant rain, and they were compelled to find indoor amusement until about 3 o'clock. At tea a hearty vote of thanks was passed to the directors for their generosity. After this full advantage was taken of the amenities of Redcar and Saltburn until 9.30 p.m., when the time came for returning to Bradford.

"PORTMANTOLOGISM."—"A specimen was contributed unwittingly by our garrulous cook when telling us of the trying time she had had in hospital and how her operation had been held up by the late arrival of the atheist."—A correspondent of "The Times."

A NEW "DANGEROUS DRUG."—Reporting the loss, presumably, in a street, of a small box containing tablets, the "Daily Herald" adds: "The tablets contain a dangerous drug, pheno-baritone." The box was apparently keeping the uneven tenor of its way at the time of going to press.

A New Pharmacy at Sligo

One of the finest pharmacies in the West of Ireland has recently been opened in O'Connell Street, Sligo, by Mr. T. P. Toher, M.P.S.I., of the Sligo Drug Co. This business, with its attractive modern front and its well appointed interior (all the work of A. H. Bex, Ltd., shop fitters, Dublin), strikes a completely new note in pharmacy design in the West. The front, as will be seen from the photograph, is executed in marble with Staybrite metal window casings. The doorway is an especially pleasing piece of work with its ornate and decorative lines. Another outstanding feature is the admirably designed window on the left for the display of optical goods. The interior is in keeping with the front. Fitted out in mahogany and plate-glass, it affords a fine opportunity for the displaying of stock. The dispensing department



is planned to utilise all available space, adequate cupboards and shelving being installed. This new branch of the Sligo Drug Co. was originally in Wine Street, but when Boyer's Medical Hall, in O'Connell Street, was offered for sale Mr. Toher purchased it, and the new pharmacy is reconstructed upon the site of Boyer's Hall. In addition, an optical department has been added. The second floor of the pharmacy is utilised to house an up-to-date photographic D. and P. department. Mr. M. Mulreany, M.P.S.I. (gold medallist), is the manager of Mr. Toher's new pharmacy.

The Chemical Consultant

The necessity of chemical research in connection with industry has long been considered essential to progress. It is certain that the vast amount of work done and the millions made every year from the converting of waste matter into profitable products have been for the most part a direct result of the labours of research chemists. This one aspect of industry alone has proved the consultant chemist is indispensable to commerce. There are several leading firms in this country who have their own laboratories and staffs of chemists: on the other hand there are a good many more who cannot possibly afford such an expensive overhead. In both cases the consultant chemist is available to give his individual services for specialised work. In the first instance, where the laboratory is part of the organisation, the necessity for calling in an outside opinion may not seem at first apparent. Often there is a continuous stream of routine work which must be done by the inside staff, and it is not feasible to allow the staff chemists to undertake long intensive research work which does not appear to be immediately profitable. Also the work in question may need to be handled by someone who is considerably more skilled and competent than any member of the staff. It may, too, be necessary to have the advice of someone who is conversant with the legal side of the profession, and who has a knowledge of patents connected with the manufacture of products or of processes. A works chemist can hardly be expected to keep in touch with this side of his subject, nor has he the facilities. The consultant, on the other hand, regards this as an important branch of his practice and one in which he can be of the greatest possible assistance to his clients.

It is not, however, to this type of firm that the value of the consultant chemist needs to be stressed, as a rule. There are the thousand and one other manufacturing concerns, some large and important, some small and important, who, as far as analysis and chemical researches are concerned, adopt a conservative attitude. They are much too content to watch other countries and other concerns turning out better products—making bigger turnovers. They seem to argue that "it is not theirs to reason why." An unproductive argument! Surely it would be money well spent to retain the services of a consultant analytical chemist who could deal with all such industrial problems?

The enterprising manufacturer who suspects that his competitor is making a better article to some secret formula can call in the consultant to deal with that one problem if he likes. On the other hand, it would be more to his advantage to keep his consultant on a retaining fee so that his valuable services can be called upon at any time to investigate and deal with all problems of production which are likely to arise. The retaining fees of a consultant chemist differ of course according to the services desired, and are purely nominal. They certainly do not constitute an expensive item for the services of a skilled chemist, the use of a well-equipped laboratory, and the possibilities of advancement which might arise from such services. The old system of muddling along and hoping for the best in industrial development is fast dying. It is a new age—an age of research—of chemists—of enterprise. And an important figure in this new development is the consultant chemist.—Consultants (16/3).

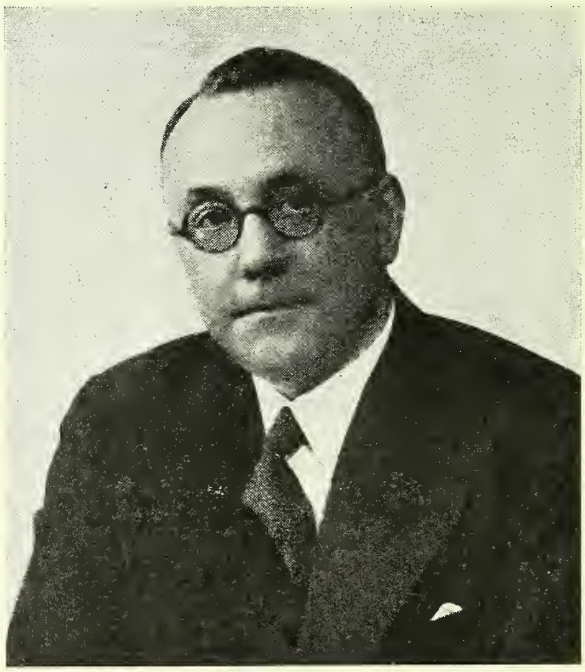
BRITISH PHARMACEUTICAL CONFERENCE

The Chairman's Address

PHARMACOPŒIAS AND FORMULARIES

THE last few years have seen much activity in the revision and production of the national pharmacopœias of European countries. Within a short space of time, besides the British Pharmacopœia, the national pharmacopœias of the following countries have been published:—Italy (1930), Spain (1930), Belgium (1930), Denmark (1933), Switzerland (1933), Yugoslavia (1933), and Hungary (1934).

The Conference may claim to have been, throughout its seventy-one years of existence, of material help in the production of the successive British Pharmacopœias by providing a medium for the discussion and publication of research on pharmaceutical problems. The greater number of the papers presented at the meetings and published in the "Year Book of Pharmacy" have dealt with subjects related to pharmacopœial revision and, directly or indirectly, have formed the raw material for the construction of the national book of medicines.



C. H. HAMPSHIRE,
M.B., B.S. (Lond.), M.R.C.S., L.R.C.P., B.Sc. (Lond.), F.I.C., Ph.C.
CHAIRMAN OF THE
BRITISH PHARMACEUTICAL CONFERENCE, 1933–34.

It seems appropriate therefore to put before you in this address some account of these recent Pharmacopœias and some thoughts which are suggested by a survey of the subject, especially from the international point of view. For a variety of reasons a national Pharmacopœia cannot be expected to provide for all the requirements of medicine and pharmacy, and other volumes, published under the authority of public bodies or by private enterprise, take a worthy place in the literature. It is fitting that something should be said also about recent issues of these books and their bearing upon our work. A study of the Pharmacopœias which have held currency in this country since the first London Pharmacopœia was published would reveal an evolutionary process, and, among the many changes which have occurred, the alteration in character from what was formerly mainly a collection of recipes to the present book of standards would appear as the most significant.

The Pharmacopœia of the day represents current medical practice and should reflect the best knowledge of the time in the medical, pharmaceutical and chemical fields. Changes in content due to changes in the direction of medical thought are therefore evident when a succession of Pharmacopœias is considered. The attitude of medical practice towards individual drugs changes with the passage of time. Drugs are introduced on high authority and supported by expressions of clinical confidence, they flourish for a time and then sink into a position of relative unimportance and finally pass almost completely out of use.

Paris, writing more than a hundred years ago,* analysed the reasons for these changes in a passage which merits quotation:—

> "The revolutions and vicissitudes which remedies have undergone, in medical as well as popular opinion, from the ignorance of some ages, the learning of others, the superstitions of the weak, and the designs of the crafty, afford ample subject for philosophical reflecting."

He then classes these revolutions under the prominent causes which have produced them:—

> "Superstition—Credulity — Scepticism — False Theory — Devotion to Authority and Established Routine— . . . The assigning to peculiar substances Properties, deduced from Experiments made on inferior Animals—Ambiguity of Nomenclature—The progress of Botanical Science—The application and misapplication of Chemical Philosophy— . . . The ignorant preparation, or fraudulent Adulteration of Medicines . . . And the obscurity which has attended the operation of compound medicines."

How far these influences have effect at the present day is a subject on which I express no opinion. Doubtless we would be prepared to add to them one more—the technical and literary efforts of pharmaceutical manufacturers.

Besides these fluctuations in usage, another cause influencing the character of the Pharmacopœia is the greater degree of protection now afforded to the public in the matter of the purity of drugs and the consequent call for authoritative standards. The achievements of scien-

* Paris, "Pharmacologia," 3rd Edition, 1820.

BRITISH PHARMACEUTICAL CONFERENCE 1934

tific medicine and the increasing use of specific remedial agents based on rational rather than empirical considerations should have a considerable effect in moulding a modern pharmacopœia. One would expect an up-to-date book of medicines to describe serological and bacteriological products, specific arsenical drugs, drugs produced from animal glands having definite physiological effects, and vitamin preparations, all in accordance with the best information available at the time, to employ for purposes of standardisation all the resources of physiology, chemistry and physics, and to provide instructions for the preparation of sterile materials for injection.

The British Pharmacopœia

We are accustomed to regard as the first Pharmacopœia the volume produced by the Royal College of Physicians of London in 1618. This is a formulary containing recipes for over 900 preparations and a lengthy list of the ingredients, without, however, any description or tests for their control. The first impression of the casual reader may be one of amusement at the multiplicity of the ingredients of many of the preparations or of distaste at the nature of some of the animal substances employed, but the fundamental principles of the pharmaceutical art and the beginnings of chemical knowledge are there. Ideas on these subjects have been changed. Complicated preparations made from numerous drugs are not now in favour—though we should not forget the existence of survivals like Warburg's tincture, with its nineteen ingredients, and some preparations of recent origin such as compound syrup of glycerophosphates, with its fifteen ingredients—while it is the constant endeavour of scientific workers to place the use of animal substances on a rational basis.

The Royal College of Physicians of Edinburgh produced its first Pharmacopœia in 1699, and the Royal College of Physicians in Ireland published the first Dublin Pharmacopœia in 1807. These were also mainly formularies. The three Pharmacopœias continued through many editions, maintaining much the same character but increasing gradually the descriptive and standardising element until the production of the first British Pharmacopœia. The existence of three standard works side by side, all having similar authority and prescribing differing formulas for the same drugs, gave rise eventually to representations regarding difficulties and confusion in dispensing, which were met by the inclusion in the Medical Act of 1858 of a section requiring the General Medical Council to publish a British Pharmacopœia. Six British Pharmacopœias have appeared, and the successive volumes show the changes which I have mentioned. The development in the character of the book is indicated in Table I, in which the monographs of the members of the series are classified.

TABLE I

CLASSIFICATION OF THE CONTENTS OF THE BRITISH PHARMACOPŒIA

——	B.P. 1864	B.P. 1867	B.P. 1885	B.P. 1898	B.P. 1914	B.P. 1932
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Crude vegetable drugs ...	21	18·5	17	16·5	16	12
Inorganic chemicals	14·5	16	15	14	13·5	16
Organic chemicals	4·5	4·5	6·5	8·5	11	20
Animal products	1	1	1	1	1	3·5
Galenicals	33	33	33·5	31·5	29	24·5
Compounded preparations ...	20	21·5	21·5	22·5	22·5	15·5
Oils, fats, waxes. resins and soaps	6	5·5	5·5	6	7	7·5
General monographs ...	—	—	—	—	—	1
Total number of monographs	625	764	903	835	814	587

Such an analysis as this can only be made roughly, and the percentage figures are intended to be merely approximate. In order to bring out the significance of the formulary element an attempt has been made to separate compounded preparations from galenicals, including under the former heading those preparations which may be made by the operations usually carried out at the dispensing counter, and under the latter head those which require the more complicated procedures of the manufacturing laboratory. Such a separation is of necessity somewhat arbitrary, but the rough figures obtained give at least some idea of the changes under consideration. It will be seen that in the development of the British Pharmacopœia there has been a decrease in the number of crude vegetable drugs, galenicals, and compounded preparations, accompanied by an increase in the numbers of inorganic and organic chemicals, of animal products and in the group of oils, fats, waxes, resins and soaps.

Pharmacopœias of Other Countries

The Pharmacopœias which have been produced in recent years in other countries repay study from the point of view of estimating how far the process of change from formulary to book of standards has progressed, and how far the other features to which I have alluded as requisite in a modern pharmacopœia have been developed. Table II shows a classification of the contents of the more recently published pharmacopœias, and the brief account of each which follows indicates the most interesting features which become apparent when a general survey is made.

TABLE II

RECENT PHARMACOPŒIAS OF OTHER COUNTRIES COMPARED WITH THE BRITISH PHARMACOPŒIA, 1932

——	B.P. 1932	Italian 1929	Belgian 1930	Spanish 1930	Danish 1933	Swiss 1933	Yugoslavian 1933	Hungarian 1934
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Crude vegetable drugs...	12	16·5	17	14	17	17·5	18	15·5
Inorganic chemicals ...	16	14·5	14	16·5	16·5	13·5	17	18·5
Organic chemicals ...	20	15·5	16·5	20·5	19·5	15	17·5	17
Animal products ...	3·5	1·5	2	5	0·5	1·5	2·5	2
Galenicals ...	24·5	20	18·5	17	14·5	17	19	20
Compounded preparations	15·5	24·5	23·5	17·5	22	28	12·5	15
Oils, fats, waxes, resins and soaps ...	7·5	4·5	5·5	6·5	7	5	7·5	9
General monographs ...	1	3	3	3	3	2·5	6	3
Total number of monographs	587	805	805	826	562	1,148	685	566

The Italian Pharmacopœia

The fifth Italian Pharmacopœia was published in December 1928, and came into force by Government decree in November 1929. It was prepared by a commission consisting of a physician, three pharmacologists, professors of bacteriology, physiology, physio-pathology, veterinary surgery, public health, chemistry, clinical chemistry, and pharmaceutical chemistry, two botanists, three pharmacists, a lecturer in pharmaceutical chemistry, with a Government official and two professors of general chemistry as secretaries.

The book contains 805 monographs, including a high proportion of crude drugs, galenicals and compounded preparations. Eleven products of animal origin are described, including antidiphtheric and antitetanic serums, vaccine lymph, and tuberculin. Insulin and pituitary extract are not described. The newer synthetic organic chemicals, including hypnotics and local anæsthetics, are well represented. A list of thirty-nine organic arsenical preparations which are subject to Government control is given, arsphenamine, neoarsphenamine, sodium arsanilate, and sodium methylarsinate being described in detail. The subject of sterilisation is dealt with very adequately in this Pharmacopœia. The general notices include a good general article in which the usual methods

BRITISH PHARMACEUTICAL CONFERENCE 1934

are described and seventeen special formulas for sterilised preparations for injection are included in the text of the Pharmacopœia.

Physiological methods of assay are not included. Digitoxin (crystalline digitalin) is described, and the preparations of digitalis are standardised to contain definite proportions of digitoxin, the assay being made by a chemical method. Kombé strophanthin is described, but tincture of strophanthus is not standardised. On the pharmaceutical side the work has been well prepared. The principle of describing processes by means of general monographs is well developed, and there are general articles for instance on the preparation of collyria, pills, pastilles, suppositories, bougies and, a rather unusual one, lemonades. There are numerous formulas for such preparations as syrups, suppositories, emulsions, pastilles and ointments.

The Belgian Pharmacopœia

The fourth Belgian Pharmacopœia was produced in 1930 by a commission nominated by the Ministry of the Interior and Hygiene. The commission includes three professors of pharmacology, three professors of pharmacy, two pharmacists, two inspectors of pharmacies and a professor of veterinary medicine. The analysis of the titles of the 805 monographs shows relatively high proportions of crude drugs, galenicals and compounded preparations. The principle of biological assay is accepted, but detailed instructions for carrying out the various methods are not given. For these, reference must be made to the reports and memoranda of the League of Nations. The biological procedures are recognised in relation to the arsenobenzenes, digitalis—leaf and tincture—male fern—rhizome and extract—insulin, adrenaline, pituitary preparations, thyroid preparations, squill and strophanthus. The established drugs of animal origin included are antidiphtheric, antimeningococcic and antitetanic serums, as well as tuberculin and vaccine lymph.

The newer synthetic drugs and the organic arsenical compounds are well represented. On the chemical side, one notices the omission in some instances of standards and assay processes for simple, straightforward substances for which they could easily have been included. On the formulary aspect, the preparations are of well-known and approved character, and general processes are suitably described in concise general monographs. The subject of sterilisation is dealt with in a short article giving six alternative methods along accepted lines.

The Spanish Pharmacopœia

The eighth Spanish Pharmacopœia was published in 1930 and was prepared by a commission of pharmacists, medical men and veterinary surgeons nominated by the National Academy of Medicine. It is modern in type with a relatively low proportion of crude vegetable drugs and an unusually good proportion of animal products. An outstanding feature is the large number of serums and vaccines which are included and described in considerable detail. There is a general article on opotherapeutic preparations in which the general methods for the preparation of gland products, including dried powders, dry extracts and liquid extracts for taking by the mouth, and sterile preparations for injection, are described. The monograph on pituitary includes the desiccated powder of the whole gland and a solution for injection, prepared from the posterior lobe and standardised biologically. Insulin is not included. Biological standardisation is adopted for the usual drugs. The Broom and Clark method for the standardisation of ergot and its preparations is described, using ergotamine as standard. Digitalis leaf and tincture are standardised biologically against the International Standard Powder. Strophanthus and squill and their preparations are also standardised biologically, ouabain and scillaren being the respective standard substances employed.

Sterilisation methods are well described in a comprehensive article, and there is a section on the preparation of solutions for injection, including twenty-four formulas for special injections. The newer synthetic remedies are adequately represented, and there is not much duplication of drugs having similar actions. The group of organic arsenicals is represented by six substances, which are subjected to chemical, biological and clinical control.

This is one of the most satisfying and instructive of the modern pharmacopœias. The pharmaceutical element is well maintained but not overdone; the general monographs are useful and to the point. On the whole, the crude drugs seem to be well selected, although a few old-fashioned drugs, such as musk, castoreum and cerium oxalate are included. Even the few facts which it is possible to record here show that the book is in close relation to modern medicine.

The Danish Pharmacopœia

The eighth Danish Pharmacopœia was published in March 1933. It was prepared by a commission appointed by the Minister of the Interior, the six members of the commission including a physician, professors of pharmacology, pharmacognosy, and chemistry, and two pharmacists.

It is interesting to note that the possession of a copy of the Pharmacopœia by medical practitioners is compulsory; this is an obligation which, in most European countries, is placed upon pharmacists only. The number of articles included, 562, is relatively small and shows a high proportion of crude vegetable drugs and compounded preparations, with a moderate number of galenicals and very few animal products. Serums, vaccines, and other bacterial products, which are distributed by the State Serum Institute, are not described. Organotherapeutic remedies and organic arsenical compounds are not included for the reason, as stated in the Preface, that the methods of preparation and standardisation of these drugs are rapidly developing and the requirements of the Pharmacopœia are intended to apply over a number of years. Biological standardisation is required for digitalis and for cod-liver oil. The methods of biological assay are not described, the technique required being contained in regulations issued by the Department of the Interior.

Sterilisation or aseptic preparation of the official injections is specified. General instructions are given in a short article, and a list of twenty-seven drugs showing the highest temperatures at which their solutions may be sterilised by heat without injury is given in an appendix. A few of the newer synthetic remedies are included, and the general treatment of chemical testing is adequate. This is distinctly a pharmaceutical pharmacopœia with a preference for formulas and methods suited to the practising pharmacist, and the formulary element is strong. There are good general monographs on the preparation of lozenges, capsules, cachets, pills, compressed tablets and on the methods of making galenicals. Tablet-making is dealt with in especially full detail, and sixteen special formulas are given.

The Swiss Pharmacopœia

The fifth Swiss Pharmacopœia was published in August 1933 and came into force on July 1, 1934. It was prepared by a commission nominated by the Federal Council, including the Director of Public Health as president, professors of clinical medicine, pharmacology, pharmaceutical chemistry, botany, pharmacognosy and pharmacy, a food chemist, a pharmaceutical manufacturer and four pharmacists, including a military pharmacist. The Pharmacopœia contains 1,148 monographs, the largest number contained in any of those under discussion. There is a high proportion of crude vegetable drugs and galenicals and an exceptionally large number of compounded preparations. A limited number only of animal products is included, antidiphtheric serum, antitetanic serum, tuberculin and vaccine lymph being the only members of the serological and bacteriological class of products. Insulin, pituitary extract and biological methods of standardisation are omitted for the reason, I am informed by Professor Golaz, that

BRITISH PHARMACEUTICAL CONFERENCE 1934

there is no State Laboratory for biological control in Switzerland. For the same reason all reference to the biological testing of such drugs as digitalis and ergot is omitted. New synthetic drugs are well represented; of the organic arsenical compounds, sodium acetylarsanilate, neoarsphenamine and silver neo-arsphenamine are included. Sterilisation is adequately treated in a special article and notes on the methods specially suitable for the individual drugs are given in the monographs. There are eight special formulas for injections.

From the pharmaceutical point of view this book is of great value. The general monographs on groups of preparations and pharmaceutical methods are good, and the formulas themselves are well constructed and, while showing a Continental bias, contain much that is useful to the British pharmacist. A distinctive feature of this Pharmacopœia is the large number of compounded preparations and galenicals, which, coupled with the absence of certain important specific drugs, leads one to describe it as very largely a formulary. At the same time it must be said that the botanical and chemical descriptions and tests are sufficient and up-to-date.

Three weeks ago, while this address was in the final stages of preparation, the Yugoslavian Pharmacopœia, 1933, and the Hungarian Pharmacopœia, 1934, came into my hands. The Yugoslavian Pharmacopœia is printed in Slavonian and little more than an analysis of the titles of the drugs included is possible to me. It is understood that Latin and Serbian versions will be published later. The Hungarian Pharmacopœia is printed in Latin, and is therefore more manageable.

The Yugoslavian Pharmacopœia

An advance description of this Pharmacopœia by Professor Vrgoč, recounting the difficulties attending its production and indicating the general nature of its contents, will be found in THE CHEMIST AND DRUGGIST for June 25, 1932, pp. 744-45. From this it appears that pharmacognostic and chemical methods are relied upon for the standardisation of drugs, and that in the preparation of galenicals those methods are preferred which may be most readily practised in the pharmacy. Examination of the contents reveals a high proportion of crude drugs and galenicals with a comparatively low proportion of compounded preparations. A good selection of the new synthetic drugs, including five members of the organic arsenical group, is described. There is a brief general article on serums followed by short descriptions of ten specific products of this class. Tuberculin and insulin are described, the latter very briefly. There is an article on sterilisation. Although as a whole the book appears to be on rather old-fashioned pharmaceutical lines, the inclusion of specific drugs and of an article on sterilisation are evidences of some infusion of the modern spirit.

The Hungarian Pharmacopœia

The fourth Hungarian Pharmacopœia was published in 1933, and came into force by Government decree on June 1, 1934. It has been prepared by a committee consisting of professors of pharmacology, pharmaceutical chemistry, and pharmacognosy and a pharmacist. Analysis of the contents shows that crude vegetable drugs are well represented and, though there is a rather high proportion of galenicals, the formulas for compounded preparations are comparatively fewer than in most of the other Pharmacopœias. The animal preparations include antidiphtheric and antitetanic sera, pituitary (posterior lobe) extract and insulin. Apart from references to units in relation to these drugs, biological assay does not appear to be mentioned. Vitamin D is included in the form of an oily solution and as tablets. These are required to conform to a legal standard, but no units or methods are mentioned. Newer synthetic drugs are reasonably well represented, but neoarsphenamine is the only organic arsenical drug described. There is a short article on general methods of sterilisation and a more complete account of the preparation of ampoules of sterilised solutions, which includes detailed instructions regarding the treatment of eighteen drugs. There are four solutions for injection to be dispensed in ampoules. The galenicals are numerous, and appear to be well worked out. Compressed tablets are described, and ten special formulas are given. Seventeen concise general monographs on the manufacture of groups of preparations are included. In this Pharmacopœia the pharmaceutical side is well maintained, while inclusion of some of the newer drugs, although imperfectly characterised, indicates development on modern lines.

An International Pharmacopœia

For reasons similar to those which led in this country to the demand for a British Pharmacopœia, there has arisen from time to time a desire for the unification of the standards for drugs and of the strengths and formulas of preparations through the medium of an International Pharmacopœia. The advantages of such uniformity, particularly but by no means exclusively on the Continent of Europe, are obvious. Differences in national standards for widely used materials are a hindrance to the spread of medical knowledge, an inconvenience to pharmacists who have to dispense prescriptions brought from various countries, and a source of trouble and possibly of danger to travellers, who may experience delay in receiving medicines which have to be specially made or procured. An International Pharmacopœia would remove these difficulties, would tend to economy of production and would facilitate commerce in drugs.

Projects for the preparation of an International Pharmacopœia have been discussed at many International Pharmaceutical Congresses. An early attempt in 1874 to introduce one which was based on the French Pharmacopœia of that day failed, but eventually a draft International Pharmacopœia was compiled by a committee appointed at the Fifth International Pharmaceutical Congress held in London in 1881 and presented to the Sixth Congress in Brussels in 1885. At the British Pharmaceutical Conference held in that year at Aberdeen, Dr. Paul gave an account of the proposed volume, and the full Latin text was published in "The Pharmaceutical Journal" at that time.* This Pharmacopœia described 293 articles, including 152 galenicals and compounded preparations, 103 chemicals and thirty-eight vegetable and animal drugs. For some unexplained reason the book was not brought into use in any country, and was forgotten. It is evident that the difficulties to be overcome in the production of such a comprehensive International Pharmacopœia and the obstacles to its acceptance as the official Pharmacopœia of individual countries are formidable; but they are not necessarily insurmountable.

Later efforts to bring about international uniformity have been wisely of more restricted scope, attention being concentrated on the more potent drugs. Following the Brussels Conference of 1902 the first International Agreement for the Unification of the Formulas of Potent Drugs was produced and signed in 1906. A full discussion of this Agreement need not detain us. It is sufficient to remark that the strengths of preparations and methods of procedure stated in this document were adopted in the British Pharmacopœia, 1914, with a few exceptions. A discussion of the Second Agreement will be more profitable, since some indication as to the possibility of an International Pharmacopœia in the future may be gathered from the contents of the Agreement and from the extent of the recognition accorded to its provisions in various countries.

The Second International Conference was held in 1925, and the Agreement which resulted from its deliberations was completed in 1929 with the intention that its provisions should come into effect on September 1 of that year. Of the thirty-two governments which were represented at that Conference, fifteen ratified the Agreement. Of the fifteen signatories, ten made reservations. A typical form of reservation is that appended by the British Government:—"The Government of His Britannic Majesty declares that it reserves the right of introducing into the

* "Pharmaceutical Journal." 1885-6, [3], 16, 290, 329, 346, 491, 547, 585.

BRITISH PHARMACEUTICAL CONFERENCE 1934

stipulations of the present Agreement such modifications in detail as established usage in medical and pharmaceutical practice renders expedient, and the progress of medical and pharmaceutical science may from time to time render necessary." Several governments added other reservations on special points.

The Agreement consists of forty-one Articles. These cover such subjects as the general principles of the preparation of galenicals, a definition of a standard "dropper," biological testing of the arsenobenzenes, nomenclature and maximal doses. The principal interest, however, centres in Article 8, which includes a table of the strengths and descriptions of a number of poisonous drugs and their preparations. It is interesting to note the degree of concordance with Article 8, which the British Pharmacopœia Commission, working with the most complete desire to fulfil the requirements of the International Agreement so far as conditions in Great Britain and the British Empire made possible, were able to attain. Of the seventy-seven drugs named in this Article only forty-three are described in this British Pharmacopœia, and, of these, twenty are in accordance with the requirements of the Agreement or differ only very slightly, twelve are in compliance but further standards are added, and eleven drugs differ in their standards from those of the Agreement.

In the Swiss Pharmacopœia the provisions of Article 8 are followed with the exception of nineteen drugs. In the Danish Pharmacopœia lists are given which show that twenty-seven drugs comply with the International Agreement in both manner of preparation and in strength. The others included differ either in mode of manufacture or in strength or in both. The Belgian Pharmacopœia IV in the Preface states that the Commission kept as far as possible to the provisions of the International Agreement. The Spanish Pharmacopœia has also followed the International Agreement to a considerable extent. The degree of unification indicated, while it is satisfactory as far as it goes, can only be described as partial. One cannot escape the conclusion that we have a very long way to go before a Pharmacopœia could be produced to provide, even for the most obviously poisonous drugs, standards which will be acceptable throughout all countries.

The hopes of the delegates to the International Conference for the future development of international unification are expressed in certain Articles which are designed to provide for a permanent organisation for the unification of Pharmacopœias having a permanent secretariat which would have the duty of co-ordinating the work of the national Pharmacopœia Commissions. Other Articles provide for the formation of two special Commissions, one for the international study of the unification of assay methods and the other for the unification of the methods of preparing galenicals. The remaining Articles provide for the admission of other governments to the Agreement and for the resignation of contracting governments.

The Articles dealing with the formation of an international organisation are framed with the intention that the League of Nations should take over the administration of this work ; but inquiries show that this intention has not been realised, and the outcome of the high hopes which no doubt animated the enthusiasts at the Conference is somewhat disappointing. I am indebted to Professor Zunz, of the University of Brussels, for an account of recent developments. It appears that the Health Organisation of the League of Nations have deferred their acceptance of the responsibilities which the International Agreement proposed to place upon them, and have concurred in a provisional arrangement whereby the Belgian Pharmacopœia Commission acts as the central authority for this purpose. The Belgian Commission has taken steps towards the compilation of an agreed table of maximal doses and has circulated information and data received from other Commissions. The special Commission to deal with galenicals, of which Professor Golaz was nominated president, has covered some ground, but up to the present no definite decisions appear to be ready for report. The special Commission on assay processes, I am informed by Professor Van Itallie who was nominated president, has not started work.

In brief, five years have passed and little worth reporting has been accomplished. The British representatives appointed to the special Commissions on galenicals and assay processes were the late Professor Greenish and the late Mr. Edmund White. As far as I can discover, no procedure exists for the appointment of successors to these deceased representatives. Apparently the effort necessary to secure a Third International Conference must be made before Great Britain can play a part in the investigations and deliberations necessary for international unity in galenical preparations and standardisation.

The account which I have given of the international activities in pharmacopœial work, brief though it is of necessity, indicates, I think, clearly that there are difficulties to be overcome before effective action is secured. There is need for continuous and united pressure if anything substantial is to be accomplished beyond the progress already made. The unification of assay methods, of manufacturing processes and of tests and standards is an object worthy of the thought, enthusiasm and effort of those interested in the sciences of medicine and pharmacy. The formation of a permanent central organisation to maintain contacts among the various national Commissions, to arrange for collaborative investigations and to collect and distribute reports on subjects related to pharmacopœial revision, is an urgently necessary step which would do much to bring about the desired unification.

Formularies

Side by side with the national Pharmacopœias numerous books of recipes have been produced in the various countries. Three of these, the American National Formulary, the German Ergänzungsbuch and the British Pharmaceutical Codex merit special attention by reason of their publication by the national pharmaceutical organisations of their respective countries. The need for such formularies, produced by responsible public bodies, becomes more and more pronounced with the changes in the character of pharmacopœias and the decreasing attention given in them to formulas.

The National Formulary has been produced by the American Pharmaceutical Association as a companion to the United States Pharmacopœia since 1881, and the fifth edition (1926) is now current. The general principles stated by the compilers show that the purpose is to supply definite formulas for preparations in frequent use which are not included in the United States Pharmacopœia and to provide standards and tests for those ingredients which are not defined by the Pharmacopœia. The intention to describe imitations of proprietary or trade-marked articles or to take any responsibility for the therapeutic efficacy of the drugs described is specifically disclaimed. This formulary presents authoritative accounts, much on the same lines as those of the pharmocopœial monographs, of many drugs which, though they may not have reached or may have declined from pharmacopœial status, are in demand. It is a valuable book of reference for the Britsh pharmacist and, no doubt, is much used by the American practitioner of pharmacy.

The German "Ergänzungsbuch," which is produced under the direction of the German Pharmaceutical Society, first appeared some forty years ago, and the present edition (1930) is the fifth. It provides, in much the same way as the American book, formulas and standards for non-official drugs, and the scope does not go beyond this.

The British Pharmaceutical Codex, which was first produced by the Pharmaceutical Society of Great Britain in 1907, is more ambitious in design and comprehensive in scope than the other two books. The characteristics of this work are well known, and the developments and special features of the fourth Codex, which is now in the

BRITISH PHARMACEUTICAL CONFERENCE 1934

press, have been explained by the editor, Mr. C. E. Corfield, at a meeting of the Pharmaceutical Society during the past session.* The Codex is a valued work of reference for the pharmacist and the medical man which goes far towards supplying his ordinary day-by-day need for information, and at the same time provides standards for many drugs in regular use for which there are no standards in the Pharmacopœia. Two features of the Codex, additional to those to be found in the other two books, which materially increase its usefulness as a reference book, are the inclusion of monographs on the drugs contained in the Pharmacopœia and the descriptions of physiological effects and therapeutic applications which form part of each monograph. The friendly relations existing between the Pharmacopœia Commission and the Codex Revision Committee have made possible the inclusion in the new Codex of a regulated amount of the pharmacopœial contents, without injury or prejudice to the Pharmacopœia. At the same time the Codex provides the means of maintaining the formulas of preparations deleted from the Pharmacopœia, thus enabling the Commission to concentrate attention on the provision of standards and tests for the newer drugs and to develop the Pharmacopœia on modern lines.

Of the smaller formularies and hospital pharmacopœias there is little to be said in a general survey of this kind. The National Formulary for National Health Insurance Purposes, of which the second edition was published in 1933, is of especial importance to the pharmacist, as representing the agreed basis for prescribing and dispensing in the National Health service. The Canadian Formulary, prepared by the Canadian Committee on Pharmaceutical Standards, was issued in 1933. It consists of three parts:—A Formulary Section, which continues the work of the Canadian Formulary previously issued by the Ontario College of Pharmacy; an Addendum to the British Pharmacopœia, 1932, containing modifications of the standards and formulas which are considered to be more suitable for Canada, and monographs on certain drugs and preparations which are not included in the British Pharmacopœia; and a Reference Companion, which is intended as a source of information and confers no official status on the preparations included. The Australian and New Zealand Pharmaceutical Formulary is issued by the Pharmaceutical Association of Australia and New Zealand in conjunction with the medical and dental authorities. The sixth edition, published this year, brings the book into line with the new British Pharmacopœia and includes many formulas for preparations which have come recently into use. It should be of interest to those present to remark that the book has been edited by Mr. Horace Finnemore, whose services to this Conference as secretary and as a contributor of science papers are so well and gratefully remembered. The International Formulary of Ships Medicines has been published this year by the International Pharmaceutical Federation. This is an interesting new compilation which contains the information necessary for the supply of medicines to ships in compliance with the regulations of the principal maritime countries. Glossaries showing the names of drugs in the languages of the countries concerned side by side with the corresponding Latin titles are provided and the formulas are set out in Latin under Latin and vernacular titles with directions in English, French and German. This book should prove of great service to those pharmacists who are called upon to replenish ships' medicine chests. Those concerned with its production are to be congratulated on a useful piece of work. The "Extra Pharmacopœia," though neither a pharmacopœia nor a formulary and therefore outside the scope of my title, cannot be omitted from any observations on pharmaceutical literature. This book has been the stand-by of medical practitioners and pharmacists for more years than I can remember, and the fact that the latest edition, which appeared in 1932, is the twentieth testifies to its continued usefulness. Its recent acquisition by the Pharmaceutical Society is an event of some importance, and this transferance to the control of a public body offers possibilities of increasing the standing and utility of the book.

The subject of recent formularies would not be completely surveyed without reference to the second volume of "Pharmaceutical Formulas," which has been published this year. This is truly fitted by its sub-title, "The Chemists' Recipe Book," for it contains instructions for making a range of preparations which, with those described in the first volume, seems to exemplify all the possibilities of the pharmacist's work—medicines, household recipes, perfumes, cosmetics, mineral waters and many other things.

These books recall to me the remark of the late Lieutenant-Colonel Harrison, made in an address to pharmaceutical students, that one great advantage which the pharmacist possesses is his unique knowledge of materials, especially of organic natural products. It needs but a glance through any of the more comprehensive books which I have mentioned to bring the realisation of the very wide range of subjects which the pharmacist touches and the great variety of the materials with which he must be familiar. The pure chemist on the one hand and the business man or the craftsman on the other has no such wide range. The books recall also another advantage of the pharmacist, namely, his skill in manipulation. It is with a sense of loss that one realises how much of this knowledge and this skill is passing into disuse as, with the march of time, the products of the pharmacists' individual art are replaced by the products of the factory.

Pharmaceutical Research

The theme of this address, like that of many others delivered from this Chair, leads to the subject of pharmaceutical research. The materials for the construction of pharmacopœias and formularies are provided largely by the papers contributed to this Conference and similar bodies. The research list of the Conference has proved of value in suggesting subjects to those desirous of contributing something to the sum of pharmaceutical knowledge, and one is led to inquire whether there are any possible extensions of the usefulness of the Conference in stimulating research. The organisation of co-operative investigations suggests itself as a sphere in which the Conference might carry out valuable work. There are many subjects, particularly the standardising of the technique of analytical methods and processes of manufacture, which are best investigated by groups of workers who are prepared to experiment with identical material and to pool results. The success attainable by such methods is shown by the noteworthy results achieved by the various Committees of the Society of Public Analysts in this country, and by the Association of Official Agricultural Chemists in the United States. The recent work done by a Committee of the Health Organisation of the League of Nations in standardising the technique of the assay of opium provides another instance of successful effort on these lines. The formation of the investigating commissions by the Second International Conference, to which reference has been made, indicates the appreciation by that assembly of the value of such methods. Much good work of this kind was also done by the voluntary efforts of subcommittees of the British Pharmacopœia Commission with results which were eventually included in the British Pharmacopœia, 1932, and it is hoped that similar efforts will continue with much benefit in increasing the value of the Pharmacopœia as a book of standards.

The range could be widened, however, and all works of reference would be enriched and increased in value by the inclusion of precise and accurate methods. There is need for a central organisation which will undertake the collection and distribution of material, the comparison of results, and the publication of agreed recommendations. I venture to suggest that this Conference might well add to its service to pharmaceutical science by acting, through a Research Committee appointed for the purpose, as an organising body in relation to pharmaceutical investigation.

* THE CHEMIST AND DRUGGIST, March 24, 1934, p. 337

Trade Notes

PURETEST YEAST FLAKES is a vitamin product marketed by the United Drug Co., Ltd., Nottingham.

T. J. SMITH & NEPHEW, LTD., Hull, are supplying cotton-wool in cellophane-wrapped cartons to retail at a popular price.

LIBRARIES.—Foyles Libraries, Ltd., Manette Street, Charing Cross Road, London, W.1, will send on application an interesting brochure to any chemist who is contemplating the installation of a library as a profitable branch of his business.

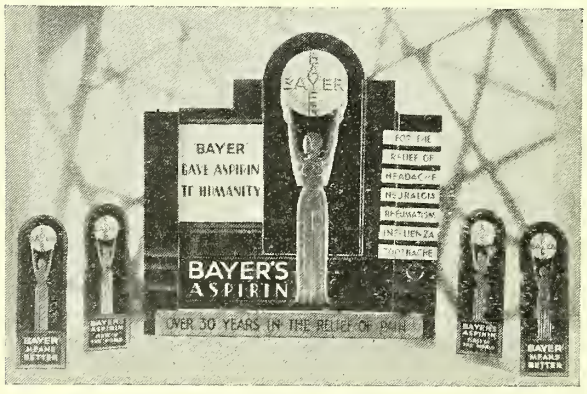
COTY (ENGLAND), LTD., 3 Stratford Place, London, W.1, ask us to call the attention of chemists to the date on which their advertisement is to appear on the front page of the "Daily Mail," i.e., July 27, and not as stated in the company's advertisement in last week's *C. & D.*

RUBBER DEODORANTS.—W. J. Bush & Co., Ltd., Ash Grove, Hackney, London, E.8, have brought out under the name Curodex a series of deodorisers and odorants for rubber. Messrs. Bush have issued an informative publication on these new products and a copy of it will be sent to any of our subscribers on request.

PARFUMERIE HOUBIGANT, 19 Rue du Faubourg St. Honoré, Paris, have sent us a copy of their current ex-works list, the prices in which are printed in pounds sterling. The ex-works prices are understood to be those at the factory; they do not include Customs duties and clearance charges which are payable on receipt of the goods, nor packing, insurance, carriage and freight (to London Docks), which will be added to invoices at cost prices. Goods in transit are at the customers' risks. As was announced in the *C. & D.*, July 7, p. 14, Messrs. Houbigant are represented in this country by The Perfumery Marketing Co., 190 Piccadilly, London, W.1.

PENTIDE.—Pentide is an 8 per cent. solution of sodium pentose nucleotides prepared by Allen & Hanburys, Ltd., Bethnal Green, London, E.2, for the treatment of agranulocytosis or malignant neutropenia, and other conditions in which increased production of polymorphonuclear leucocytes is desirable. Pentide has been tested biologically and found not to produce any toxic reaction. Its dosage is 10 c.cm. intramuscularly every day until there is definite improvement. For intravenous injection, which is advised during the first four days, 10 c.cm. of the solution should be diluted with distilled water to the strength of 0.8 per cent., and the resulting 100 c.cm. of the dilute solution should be given daily in addition to the intramuscular doses.

BAYER PRODUCTS, LTD., Africa House, Kingsway, London, W.C.2, have recently issued a new display set for their aspirin tablets. The display pieces are printed in



four colours on stout board, and are intended to form in themselves a complete window or counter show. The set will be sent on application to any chemist.

AMAMI DANDRUFF LOTION.—Prichard & Constance, Manufacturing, Ltd., Broad Street, London, W.C.2, are placing on the market a new product to be known as Amami Dandruff Lotion. The preparation is stated to have proved remarkably efficacious in dealing with this common hair trouble. The illustration shows the attractive pack, which is produced in red, gold and black. Advertising of the lotion will shortly appear in the national and provincial Press and the women's weeklies.

A. F. SHERLEY & CO., LTD., 18 Marshalsea Road, London, S.E.1, are allowing an extra discount on certain orders during the current month, while there is a further amount allowed in consideration of a window display. Particulars of these offers will be found in the company's advertisement on another page in this issue.

ERGOAPIOL CAPSULES.—In this country the distributors of these capsules (made by the Martin H. Smith Co., New York), are Thomas Christy & Co., Ltd., Old Swan Lane, London, E.C.4.

PHOTOGRAPHY AS A HOBBY.—Johnson & Sons, Manufacturing Chemists, Ltd., Hendon, London, N.W.4, inform us that with the object of helping photographic dealers to encourage practical work among their local amateurs, they have prepared five demonstrations as follows:—"Correct Development by the Azol Method"; "Flashlight Photography"; "After Treatment of the Negative"; "Toning of Gaslight and Bromide Prints"; "How to do your own Developing and Printing." Any dealer who is interested can obtain on application data and the necessary material to give either of these lessons. —Dealers will also be interested to know that the British Photographic Manufacturers' Association is to continue the national hobby campaign with an informative booklet entitled "Make Photography your Hobby—How to Develop and Print." This publication contains simple instructions and illustrations on these processes and it can be handed to camera users to interest them to do more photography. The booklet will be imprinted on the front cover with chemist's name and address and supplied at reasonable prices.

Trade-Mark Applications

The figures in parentheses refer to the classes in which the marks are grouped. A list of classes and particulars as to registration are given in "The Chemist and Druggist Diary," 1934, p. 304.

(From "The Trade Marks Journal," July 4, 1934.)

"WHITE SHIELD"; for perfumery, etc. (48). By Cussons, Sons & Co., Ltd., Moor Lane, Kersal, Manchester. 550,810.

"LEXBURN"; for all goods (48). By S. S. Garnham, 100 Alexandra Drive, Surbiton. 551,097. (Associated.)

"DISOVOL"; for all goods (48). By F. G. Harris, 177 St. Andrew's Road South, Lytham-St.-Annes. 551,289.

(From "The Trade Marks Journal," July 11, 1934.)

"BASSOLAX"; for laxative preparations (3). By Petrolagar Laboratories, Ltd., Braydon Road, London, N.16. 546,353.

"KOSALA"; for medicinal chemicals (3). By Selka Rubber Works, Ltd., 7A Dorset Avenue, Slough Trading Estate, Bucks. 549,295.

"CORBESIN"; for medicinal chemicals (3). By Bayer Products, Ltd., 31-34 Basinghall Street, London, E.C.2. 550,420. (Associated.)

"NEOSOM"; for non-barbituric sedative preparations (3). By J. A. S. Taylor, 13 Thornwood Gardens, Glasgow, W.1. 550,635.

Marriages

DRINNAN—SMITHSON.—At St. Oswald's Church, Sheffield, on July 16, Robert Hunter Drinnan to Elsie Smithson.

HAWKINS—DRAKE.—At St. Margaret's Church, Littleham, Devon, on July 10, Leslie Hawkins, chemist and druggist, Exmouth, to Ann Drake.

ROOTS—MEADOW.—At St. Philip's Church, Southport, recently, Reginald Roots, chemist and druggist, to N. Meadow.

TURNER—JEPSON.—At Duckworth Street Congregational Church, Darwen, on July 12, Harold H. Turner to Elizabeth May, daughter of Mr. E. Jepson, chemist and druggist, Darwen.

ANDREWS—COATES.—At St. Andrew's Church, Burnley, recently, Alexander Andrews, chemist and druggist, Cog Lane, to Mary Coates, granddaughter of Mr. U. A. Coates, chemist and druggist, Burnley.

Deaths

PHILLIPS.—At Rivington, Bolton, on July 9, Mr. Horace Stock Phillips, Ph.C., a director of Phillips & Son, Ltd., chemists, Wigan, aged fifty-six (see p. 65).

RICHES.—At Devonport, on July 5, Mr. Frank Fraser Riches, Ph.C., aged sixty-four. Mr. Riches was of the third generation to enter pharmacy, his father and grandfather having been chemists. He qualified in April 1891, passing his Major in July of the same year after a brilliant record at the "Square," where he was awarded the bronze medal for botany. After some analytical work with a German firm and retail experiences at Bournemouth, Torquay and other places, he entered the Vere Street pharmacy of Allen & Hanburys, Ltd., in 1905, and was transferred to the West of England as a representative in 1906. He remained in this capacity till his retirement in June this year, relinquishing his work on account of ill health. He was a very successful traveller, and made many friends because of his helpful nature and cheery disposition. It is evident from the large number of letters received by his widow that he will be missed by the pharmacists on whom he has been calling for many years. The funeral took place at Chingford Mount Cemetery on July 9, and was conducted by his son, the Rev. F. H. Riches, M.A., Vicar of St. Stephen's, Devonport. Among those present were Mr. W. B. Nelson and Mr. E. C. Cripps, who represented Allen & Hanburys, Ltd.

Personalities

MR. L. C. MOTE, chemist and druggist, West Wickham, Kent, was a successful candidate at the recent examination of the British Optical Association.

MR. C. R. COOMBER, general manager of P. B. Cow & Co., Ltd., London, S.W.16, has been appointed a director of the company and will in future act in the dual capacity.

MR. H. M. HEYWOOD, managing director of Ford, Shapland & Co., Ltd., London, W.C.1, has been elected president of the London Central Districts Association of the Master Printers.

MR. J. H. H. KEALL, B.Pharm., has obtained the Anne Selina Fernel scholarship tenable for three years at St. George's Hospital. Mr. Keall is the eldest son of Mr. John Keall, president of the Pharmaceutical Society of Great Britain.

MR. HENRY J. WADE, B.Sc., who recently passed Part I of the final M.B., Ch.B., examination of Manchester University, and also Section I of the final M.R.C.S., L.R.C.P., is a son of Mr. Wade (H. J. Wade & Co., Ltd., manufacturing chemists), Blackburn.

Wills

MR. FREDERICK LARDER, M.P.S., Loddon, Norfolk, who died on April 25 last, aged sixty-one, left estate gross value £2,473, with net personalty £1,480.

MR. WILLIAM PILKINGTON, 5 Compton Road, Buxton, Derby, chemist and druggist, who died on March 12 last, aged 66, left estate gross value £3,603 with net personalty £1,527.

MR. ALEXANDER LECKIE HAMILTON, Dunyra, 6 Balgair Drive, Paisley, chemist and druggist, who died on February 17 last, left personal estate in Great Britain valued £3,450.

MR. SAM SMITH, 28 The Drive, Tonbridge, Kent, chemist and druggist, who died on May 28 last, aged seventy-four, left estate gross value £1,144, with net personalty £1,108.

MR. SAMUEL ARTHUR, Park Road, Redruth, Cornwall, retired chemist and druggist, who died on November 17 last, aged 71, left estate gross value £4,697 with net personalty £4,099.

MR. HUMPHREY MORRIS, The Bungalow, Penmaenpool, Dolgelley, Merioneth, chemist and druggist, who died on January 27 last, left estate gross value £2,686, with net personalty £2,658.

MR. JOHN THOMAS CREE, 22 Clumber Street, East Kirby, Notts, chemist and druggist, who died on December 22 last, left estate gross value £2,595, with net personalty £277.

MR. JAMES CLEMENT LLOYD, 44 High Street, Lewes, Sussex, chemist and druggist, who died on April 8 last, aged seventy-three, left estate gross value £2,019, with net personalty £1,320.

MR. LEONARD LEE, Bryn Estyn, near Chester Road, Whitchurch, Salop, chemist and druggist, who died on February 28 last, left estate gross value £7,364, with net personalty £6,601.

MR. CHARLES CUMBERLAND, 128 Northgate, Wakefield, Yorks, chemist and druggist, who died on December 15 last, aged forty-four, left estate gross value £9,306, with net personalty £7,801.

MR. HORACE PARKYN, Burleigh, Lansdown Road, Torre, Torquay, chemist and druggist, who died on January 19 last, aged sixty-eight, left estate gross value £6,191, with net personalty £5,146.

MR. ALFRED SHRUBSOLE, Ph.C., Mount Vernon, Redcliffe Road, Swanage, Dorset, formerly of 16 The Grove, Golders Green, N.W., chemist and druggist, who died on October 21 last, aged sixty-seven, left estate gross value £6,614, with net personalty £6,182.

MR. JOSEPH WHITEHOUSE, Wartell House, 88 Wellington Road, Dudley, Worcs., wholesale druggist, a director of Raybould, Whitehouse & Co., Ltd., manufacturing chemists, who died on December 22 last, aged sixty-six, left estate gross value £21,526, with net personalty £19,561.

Business Changes

MR. DAVID POMEROY, chemist and druggist, has purchased the business of Mr. W. F. Garry, chemist and druggist, 9 Tulse Hill, London, S.W.2.

THE telephone number of Wright, Layman & Umney (1932), Ltd., Southwark, London, S.E.1, has been altered as from July 2 to Hop 2315 (five lines). [Corrected note.]

THE telephone number of the Tottenham works of Savory & Moore, Ltd., has been altered to "Stamford Hill 3456." Pharmaceutical Products, Ltd., and Blackaller & Pleasance, Ltd., are also attainable at this telephone number.

Information Department

INFORMATION WANTED

Postal or telephone information with respect to makers or first-hand suppliers of the undermentioned articles will be appreciated.

B/177. African camellia nail biting cream
N/187. D. calcium powder
B/187. Ectoplast
S/167. Ergosil
W/167. Fæxin
E/167. Iroginon ampoules
Y/137. Mira tooth brush

THE
CHEMIST AND DRUGGIST
VOL. CXXI. July 21, 1934 NO. 2841

The Conference Papers

After an interval of forty-four years, Leeds, a city of many attractions and of great commercial importance, is for the second time the home of the British Pharmaceutical Conference. There was a special fitness in the selection, last July, of Dr. C. H. Hampshire, secretary of the Pharmacopœia Commission and a pharmacist of high distinction, for another year of office as chairman, in that he was educated and apprenticed in Ilkley, a town included in the route of the Conference excursion on July 19. Particulars of Dr. Hampshire's career were given in our issue of July 29, 1933 (p. 172). His address as chairman of the Conference (printed in full on pp. 72–77 of this issue) took the form of an account of the latest versions of the principal pharmacopœias of the world; Dr. Hampshire compared them with the British Pharmacopœia, 1932, and we have no doubt that his valuable survey will be kept for reference by many of our readers. In presiding over the Science Section he was in charge of the discussions on the majority of the thirty-four papers presented —probably a record number, though the 1889 meeting of the Conference ran it close with a total of thirty-two. The list commences with one by Mr. T. Dewar, who gives details of *The Histology of the Leaves of Digitalis Lanata*, with a view to making identification of specimens certain. Mr. G. J. W. Ferrey describes an improved method for *The Determination of Phosphorus in Phosphate, Hypophosphite and Glycerophosphate Syrups. A Note on the Sulphuric Acid Test for Liquid Paraffin* is presented by Dr. C. H. Hampshire and Mr. G. R. Page, who invite comments and criticisms. Mr. G. R. Page, in *Notes on Some Pharmacopœial Tests*, points out their inapplicability to commercial products, and suggests practical modifications. Dr. A. St. G. Huggett finds that *The Anticoagulant Action of Azo-dyes in Blood Clotting* is due to inhibition of enzyme actions. Mr. H. Davis demonstrates, in *The Preparation of Sterile Solutions*, that steaming is preferable to tyndallisation to ensure the sterility of hypodermic solutions. Mr. F. E. Carter contributes a note on *A Stable Form of Ferrous Chloride*, the purpose being to show how the instability of this salt can be overcome. Dr. J. Coutts has carried out during three summers an examination of the *Santonin Content of Scottish Artemisias*, and shows, with the aid of tables and graphs, that the seasonal variations are regular in character. A suggestion in the last Conference research list is taken up by Mr. W. R. Heading in *A New Method of Analysis of Some Mercurial Ointments;* the author discusses a new method of analysis of the type of mercurial ointment in which mercury or one of its compounds is distributed unchanged in a fatty or paraffin basis. In a second paper Mr. Heading discusses *An Improved Method for the Assay of Strong Ointment of Mercuric Nitrate. The Stability of Mixtures of Hydrogen Peroxide and Ethyl Alcohol* is considered by Messrs. W. A. Woodard and J. Pickles, who show that such mixtures sometimes give rise to products possessing clinical significance. The authors suggest that mixtures of this type, when ordered for long periods, should be dispensed separately. Mr. A. H. Saber contributes two papers on *Senna Stalk in Powdered Senna*, giving details of procedure in the microscopical examination of specimens. Mr. J. P. Gilmour presents a paper on *The Discovery of Chloroform as a General Anæsthetic*, in which he gives an historical review of the circumstances leading up to this event, and reluctantly concludes that Simpson shows up in an unfavourable light. Messrs. C. Morton and F. R. C. Bateson establish that the compound present in *Donovan's Solution* corresponds to HgI_2, 2·5 HI. Mr. Harry Brindle shows that Kolthoff's method of *Assay of Phenazone* should be corrected for loss of iodine to reagents. Mr. S. Wetherell finds that the B.P. method of *Assay of Strong Solution of Lead Subacetate* gives results which are too low, and indicates the causes. *The Analytical Classification of the Fish Liver Oils* is continued by Messrs. N. Evers and W. Smith, who prefer cyclohexane as a solvent for spectrographic examination of the oils and give further results. A paper on *The Preparation of a Dry Extract of Ipecacuanha*, by Mr. A. W. Lupton, deals with the preparation of dry extract of ipecacuanha and gives notes on the commercial root; a dry extract which is permanent when stored under normal conditions is described, and a process of preparation is suggested. Mr. H. Burlinson has investigated *The Preservation of Mucilage of Tragacanth*. Messrs. H. Brindle and H. Burlinson have investigated *The Preparation, Viscosity and Suspending Power of Mucilage of Tragacanth*, and have arrived at some interesting conclusions regarding different methods of preparation. Mr. L. A. Haddock has tested *The Viscosity of Tragacanth Mucilages*, using the official viscometer of the British Pharmacopœia at 20° C., and as a result suggests the use of 0·4 per cent. aqueous mucilages for purposes of testing. *The Relation between Chemical Constitution and Purgative Action* is discussed by Messrs. A. P. T. Easson and co-workers, who obtain positive results with compounds containing a hydroxyphenyl group. In *A Note on the Preparation of Pure Acriflavine*, Mr. J. Marshall gives a simple method of freeing acriflavine from its accompanying unmethylated impurity. *The Analysis of Acriflavine, B.P., and Neutral Acriflavine* is investigated by Messrs. G. F. Hall and A. D. Powell, who describe a new method for the determination of unmethylated compound in acriflavine, and suggests limits. Messrs. T. Tusting Cocking and S. K. Crews contribute a study on *The Fluorescence Test for Olive Oils;* the results of the examination of a number of oils, both before and after treatment with decolorising charcoal, are shown. A paper of importance to pharmacists is that on *The Loss of Phenol from Phenol Lozenges*, by Messrs. C. A. Hill and A. D. Powell, who show an average deterioration at the rate of 1 mgm. per month to be expected under conditions of storage in most shops. Messrs. W. J. Beardsley and B. J. Styles give a new method for *The Determination of Mercury*

in Hydrargyrum cum Creta, having found the B.P. method to give "low and rather erratic results." Messrs. F. E. Rymill and R. F. Corran find, in *Further Studies on Mercurchrome*, that this substance does not correspond to a di-substituted dibromfluorescein but to a mixture of mono-and di-mercurated substance. In *The Use of Diphenylamine in the Assay of Saccharated Iron Compounds*, Mr. F. Hartley and Dr. W. H. Linnell report that titration of ferrous iron in saccharated carbonate of iron by the official method gives high results, and that the use of potassium ferricyanide as an external indicator is preferable. *The Determination of Camphor in Galenicals by Means of 2 : 4-dinitrophenylhydrazine*, by Dr. C. H. Hampshire and Mr. G. R. Page, indicates that this chemical is admirably adapted to the assay of the camphor content of galenicals. Discussing *The Cardiac Activity and Toxicity of Red and White Squills from Cyprus*, Mr. F. Wokes and Dr. S. G. Willimott find that the red variety is at least ten times as toxic as the white variety when administered orally to rats. The investigations of Messrs. T. E. Wallis and E. R. Withell, recorded in *The Fluorescence and Detection of Rhapontic Rhubarb*, seem to show that statements hitherto published with reference to the detection and estimation of rhapontic rhubarb must only be accepted with reserve, since no comment has previously been made upon the action of ultra-violet light, daylight or heat in modifying the fluorescence. Finally, Mr. F. C. J. Bird contributes *A Note on Mercuric Oxycyanide*, in which he shows that the accepted figure for solubility in water is inaccurate, and adds notes on the physical and chemical properties of the salt. The meeting of the Conference had not concluded when this issue went to press, but the reports which have reached us make it clear this year's events have been among the most successful of the long series, and that the heartiness of the Yorkshire welcome has made a marked impression on visitors from other parts of the country.

Spirit Duty

A NOTICE (No. 42) has been issued by H.M. Commissioners of Customs and Excise to manufacturing chemists and all other persons carrying on any trade in which spirits are used, calling attention to the Finance Act, 1934, Section 12, under which prohibition of use otherwise than for a medical or scientific purpose of medical articles in respect of which repayment or reduction of Spirit Duty is obtained. The notice is as follows:—

1. *Provision as to repayment of spirit duty.*—The law (Finance Act, 1918, Section 4) provides that in the case of such articles made with spirits as are recognised by the Commissioners of Customs and Excise as being used for medical purposes the maker of such articles may claim repayment of the difference between the present and the pre-war spirit duty. The regulations governing claims under this provision, and the procedure to be followed by makers of medical articles, are explained in Notice No. 41. There is also a similar provision for the reduction of the Customs duty on recognised medical articles imported from abroad.

2. *Prohibition on use of medical articles otherwise than for a medical or scientific purpose.*—Section 12 of the Finance Act, 1934, makes it an offence (*see* paragraph 7 as to the penalties) for any person to use any article in respect of which repayment of spirit duty is obtained or to be obtained, or in respect of which reduced Customs duty has been paid (as explained in paragraph 1) otherwise than for a medical or scientific purpose, unless he has first obtained the written consent of the Commissioners of Customs and Excise and has paid the difference in the duty.

3. It is to be noted that this prohibition applies to all persons, whether they have themselves made medical articles with spirits and claimed repayment (or have paid reduced Customs duty on importation), or whether they have obtained such articles from the maker or importer, or from any other supplier. All persons who may in the course of their trade or business use, or contemplate using, any articles of a medical description in any manufacture or process should therefore, in their own interests, satisfy themselves whether repayment of duty has been obtained (or reduced Customs duty paid) in respect of the spirits used in making any such articles which they may contemplate using for any purpose which is not clearly medical or scientific.

4. Typical examples of articles in respect of which repayment of duty is likely to have been obtained, or in respect of which reduced Customs duty is likely to have been paid, are strong tincture of ginger, tincture of quillaia and spirit of chloroform. The price paid or to be paid for an article is usually a good guide as to whether repayment of duty has been or is to be obtained or reduced Customs duty paid; it should be understood, however, that the responsibility for ascertaining the position is upon the person who contemplates using the article otherwise than for a medical or scientific purpose, and that it is for him to take such steps as will satisfy him that he is not exposing himself to the risk of prosecution.

5. Examples of purposes which are obviously not medical or scientific are the manufacture of confectionery, flavouring essences, or perfumery. These, however, are merely examples and do not exhaust the range of purposes which are not medical or scientific. In any case of doubt the nearest officer of Customs and Excise should be consulted.

6. In any case where a person intends to use otherwise than for a medical or scientific purpose an article in respect of which repayment has been obtained, or reduced duty paid (*see* paragraph 2), he should apply to the nearest officer of Customs and Excise for the consent of the Commissioners and for information as to the procedure to be followed in regard to the repayment of the difference in duty.

7. *Penalties for misuse of medical articles.*—The penalties for offences against Section 12 of the Finance Act, 1934, are an Excise penalty equal to three times the value of the article misused, including the duty payable thereon; and any article in the preparation or manufacture of which the article has been improperly used is forfeited.

8. *Powers to investigate uses of medical articles.*—By No. 19 in the Spirits (Medical Purposes) Regulations, 1934, the Commissioners may require any person carrying on any trade in which spirits, or mixtures or articles containing or prepared or manufactured with spirits, are in their opinion likely to be or to have been used, to give and verify particulars of the materials which he is using or has used and of any such mixtures or articles which he has sold, and to produce any books of account or other documents of whatever nature relating to any such materials, mixtures or articles; and any person so required shall give and verify all such particulars and shall produce all such books or other documents to any officer at any reasonable time.

Paragraph 2 of Notice 41 states:—Manufacturing or dispensing chemists, or any other persons intending to claim repayment under this provision (hereinafter referred to as "claimants") must comply with the Spirits (Medical Purposes) Regulations, 1934 (copies of which may be purchased from H.M. Stationery Office direct, or through a bookseller). . . . It should be noted, however, that the only alteration in the effect of the Regulations is the cancellation of the previous provisions specially noticed in paragraph 15, and that paragraphs 3-10 in this Notice merely state the requirements and procedure which are already in force.

BRITISH PHARMACEUTICAL CONFERENCE

The Proceedings

LEEDS was the Conference host forty-four years ago. The report of that meeting given in THE CHEMIST AND DRUGGIST reminds us of distinguished work for pharmacy done by men whose names are not likely to be forgotten by anyone realising the importance of research. The president was Mr. Charles Umney, who had occupied the chair at Newcastle in the previous year. The vice-presidents included Professors Attfield, Bentley and Redwood, Mr. T. B. Groves, Mr. G. F. Schacht, Mr. Richard Reynolds, Mr. Thomas Greenish, Mr. S. R. Atkins and Mr. F. B. Benger, all of them past-presidents; and the list was completed by Mr. Michael Carteighe, Mr. A. Kinninmont, Mr. S. Plowman (Melbourne) and Mr. George Ward. The treasurer was Mr. William Martindale; the general secretaries were Mr. W. A. H. Naylor and Mr. F. Ransom; the local secretary was Mr. F. W. Branson. In addition to being a vice-president Mr. Ward was chairman of the Local Committee.

The proceedings opened on the evening of Monday, September 1, with a reception, and closed on the following Thursday with an all-day excursion to Embsay, Bolton Woods and Ilkley. As is the case this year, the number of science papers was above the average; and most of the twenty-nine were discussed on presentation. Mr. Martindale (who was elected president for the ensuing year) submitted the report of the Formulary Committee and (with Mr. W. A. Salter) presented a monograph on green iodide of mercury. Among other contributors to the proceedings, Mr. A. W. Gerrard dealt with henbanes; Mr. E. M. Holmes with *Strophanthus hispidus* and with *Oroxylum indicum*; Mr. Harold Wyatt and Mr. J. F. Burnett with chloroform water as a preservative; Mr. E. J. Millard and Mr. A. C. Stark with tests for methylated spirits; Mr. William Kirkby (afterwards president of the Conference, and still interested in research) with the adulteration of saffron; Messrs. E. H. Farr and R. Wright (not, however, at that time in collaboration) with tinctures; Mr. J. C. Umney (who, like his father, became president of the Conference) with extract of malt; Mr. D. B. Dott (a veteran still with us) with other aspects of malt extract; Mr. W. A. H. Naylor (another Conference veteran) and Mr. E. M. Chaplin with the chemistry of the bark of *Oroxylum indicum*; and Dr. David Hooper (president of the Conference in 1916) with mannas. In the course of the presidential address, which "appeared to charm everybody who heard it," Mr. Umney quoted a leading London physician in condemnation of the "habit of prescribing ready-made physic," a habit leading to the position that "the art of writing a rational prescription is in danger of being lost." Our "Who Were There" list included the names of Messrs. A. H. Allen, C. B. Allen, F. C. J. Bird, W. P. Bowman, S. M. Burroughs, T. Maltby Clague, Octavius Corder, D. Fraser, J. P. Kay, Peter MacEwan (afterwards Editor of THE CHEMIST AND DRUGGIST), N. H. Martin, G. T. W. Newsholme, C. Symes, Ph.D., J. C. Thresh, M.D., W. F. Wells, and A. C. Wootton, Editor of THE CHEMIST AND DRUGGIST, a few of whom are still associated with the Conference. The attendance numbered about 200, and the Conference meeting was declared on all hands to be a great success. From the reports which occupy the succeeding pages of this issue it will be gathered that the Conference meeting of 1934 is proving a worthy successor to that of 1890.

Photo] [*Bacons'*

THE LORD MAYOR OF LEEDS
(MR. A. E. WILKINSON)

Monday Evening's Reception

On the eve of the Conference the Lord Mayor and Lady Mayoress of Leeds (Mr. and Mrs. A. E. Wilkinson) held a civic reception in the new Civic Hall opened by the King last year. After being received at the head of the grand staircase, the guests passed into the Great Hall of the building, panelled in elm with pilasters of the same wood between the windows. Whatever may prove to be the eventual place of this magnificent structure in the architecture of the twentieth century, the effect of the proportions and decorative detail of the interior is very striking, and expressions of admiration were general on the part of the Lord Mayor's guests. Following music and refreshments in the Great Hall came a tour of the council chamber with its adjacent committee

BRITISH PHARMACEUTICAL CONFERENCE 1934

rooms and parlours, each marked by striking individuality. Panels in more than one of these apartments contain lists of the city's freemen and other benefactors. There was no speechmaking at this function, nor was any needed, greetings of friends supplying abundant conversation. After about two hours a fleet of motor coaches thoughtfully provided by the Local Committee brought the majority of the guests back to the Conference headquarters, where dancing commenced with the *élan* of which the West Riding possesses the secret and continued till a late hour.

Our report of the proceedings gives the principal events of the next two days. The closing session had not concluded when we went to press.

Opening Session

Tuesday, July 17

The punctuality with which the Conference opened in the Great Hall of Leeds University on July 17 took unawares more than a few of the members who had decided to walk from their respective hotels and enjoy the morning air of the city, with the result that they stole in on tiptoe in little batches and crowded the back seats. No finer setting for a scientific gathering could have been desired than this handsome hall with its high windows, panelling and portraits. On the right of the chairman (Dr. C. H. Hampshire) were the president of the Pharmaceutical Society (Mr. John Keall), the vice-president (Mr. E. Saville Peck), Mr. D. Lloyd Howard and Mr. P. F. Rowsell; on his left were Professor B. A. McSwiney, Dr. F. W. Crossley-Holland, Mr. Herbert Skinner, Mr. J. H. Franklin, Mr. J. H. Gough, Mr. R. R. Bennett, Mr. H. N. Linstead, Mr. C. E. Corfield and Mr. G. R. Boyes. After a felicitous welcome from Professor McSwiney and a brief acknowledgment from the president came the chairman's address. Read in a summarised form, it was followed with close attention. The customary vote of thanks to the chairman was proposed by Mr. D. Lloyd Howard and seconded by Mr. J. H. Franklin, whom everyone was glad to see looking much better after his prolonged ill health. A brief acknowledgment by the chairman brought the proceedings to the interval; and with the departure of the ladies on sightseeing expeditions the faithful settled down to the reading of the formidable collection of science papers, thirty-four in number. As our report shows, the discussions on some of these papers were of considerable interest, suggesting further lines of research.

THE PRESIDENT OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN

MR. JOHN KEALL

THE CHAIRMAN briefly introduced Professor B. A. McSwiney, Professor of Physiology at Leeds University.

PROFESSOR MCSWINEY said: Mr. Chairman, Mr. President, ladies and gentlemen, I am sorry to announce that Sir James Baillie, Vice-Chancellor of the University, is unable to be present. He asks me to announce his regret that he is unable to welcome you in person, and sends his sincere wishes for the success of the Conference. It is a great pleasure to me to welcome you to the University of Leeds, and I trust that you will find the arrangements satisfactory.

The seventy-first Conference of your Society meets in Leeds at a most opportune time, for in October last year the University admitted students who wish to read for Chemist and Druggist and Pharmaceutical Chemist Qualifying examinations; and you will agree that we are fortunate in having as a member of our staff Mr. A. W. Lupton, who for many years has been associated with pharmaceutical teaching in Yorkshire. Two centres are thus established, for the Bradford Technical College has provided facilities for many years. The University, in accepting students for pharmaceutical courses, hopes to assist in the progress of pharmacy. Your Society has recently helped with the curriculum in order that students may be kept in touch with the developments which form the background of your work. We shall watch the progress of the student and that curriculum with interest. It is fully realised by those engaged in the instruction of students that it is impossible to train a student into an organic chemist, zoologist or physiologist if he or she is not given an appreciation of the importance of these sciences. If the student during that course is taught to learn, then the time spent in this University will not be in vain. I wish the Conference every success.

Proposing a vote of thanks to Professor McSwiney, THE PRESIDENT said: We regret that Sir James Baillie, the Vice-Chancellor, could not be here, but still we are grateful for his message and for everything that has been done. In thanking Professor McSwiney for his welcome we realise his words and encouragement and the work of education that has been done by the University.

APOLOGIES FOR ABSENCE

THE CHAIRMAN intimated that apologies for absence and good wishes for the success of the Conference had been received from Mr. William Kirkby, Mr. W. A. H. Naylor, Mr. F. Ransom and Mr. F. W. Gamble.

CHAIRMAN'S ADDRESS

The chairman then delivered a summary of his address, which is printed in full on pp. 72-77.

VOTE OF THANKS

MR. D. LLOYD HOWARD, in proposing a vote of thanks

BRITISH PHARMACEUTICAL CONFERENCE 1934

to the chairman, said it was impossible to give a detailed discussion of the chairman's address immediately, because one would have to study it so closely. They were very grateful for the address.

MR. J. H. FRANKLIN, seconding, said that last year the chairman gave a practical address, and he had now capped that effort by giving a remarkable review of the books governing pharmacy. He (Mr. Franklin) would like to point out that the work done in connection with this Conference had resulted in improving the medicines of the public of this country. He was quite sure that the medical profession could depend on medicines to-day in a way which they had never been able to do before. Consequently everyone benefited from the work done at the Conference.

The vote of thanks was carried with acclamation, and THE CHAIRMAN, in two brief sentences, acknowledged it. The preparation of the address, he remarked, had been interesting and pleasant.

After a brief interval for the departure of the ladies on their first excursion the reading of the science papers was commenced.

Science Section

Tuesday Morning

The first paper taken was:—

The Histology of the Leaves of *Digitalis Lanata*, Ehrh.

By T. DEWAR

[ABSTRACT]

THE leaves of *Digitalis lanata*, Ehrh., have become a regular article of commerce ; their physiological activity has been investigated by a number of workers, and the results published show that the leaves of this species have an activity which is from two to five times as great as that of the leaves of *D. purpurea*, Linn. For these reasons reliable means of identifying the leaves of *D. lanata*, either when whole or in the form of powder, are desirable. Leaves were examined from two flowering plants, from two rosette plants of the first year, and from a commercial sample which was imported from Austria in 1928. The author gives histological details of trichomes, stomata, water pores, palisade ratio, the midrib and vein islet number.

CONCLUSIONS

A. The histological characters of the leaves of *Digitalis lanata*, Ehrh., may be summarised as follows:—

1. The cells of both epidermises have anticlinal walls which are distinctly beaded.
2. The non-glandular trichomes are uniseriate consisting usually of from ten to fourteen cells ; they are confined almost exclusively to the margins of the leaves.
3. The paucity of the non-glandular trichomes causes the leaves to appear almost glabrous.
4. The presence on both surfaces of glandular trichomes with bicellular heads, usually with unicellular stalks.
5. The presence of glandular trichomes with unicellular heads, usually with from 3- to 10-celled uniseriate stalks.
6. The stomata have no specially differentiated subsidiary cells.
7. Water pores occur singly or in groups which consist commonly of two pores.
8. The absence of pericyclic fibres.
9. The absence of crystals of calcium oxalate.

B. The characters 1, 2, 3 and 7 enable these leaves to be distinguished from those of *Digitalis purpurea*, Linn.

The author thanks Mr. T. E. Wallis, Mr. T. Meazey and Mr. B. W. Nelson. The research was carried out in the Pharmacognosy Research Laboratory of the Pharmaceutical Society.

DISCUSSION

THE CHAIRMAN, in opening the discussion, remarked that the Conference was glad to have this continuation of previous work from Mr. Dewar, an example of work going on in Mr. Wallis's laboratory. He (the chairman) noticed that Mr. Dewar was able to rely on only two characters, and he would like to inquire as to the degree of certainty of these characters.

MR. DEANE pointed out that this was a very useful paper. Some time ago a Continental firm had pressed the sale of *Digitalis lanata* in this country on account of its increased potency ; but there was no evidence that the action was the same as that of *D. purpurea*, and there was in fact no great demand for it. He would like to inquire whether there was any microscopical difference between the leaves of young plants and those of older plants.

MR. WALLIS praised the paper as a careful piece of work, and congratulated the author. It was evident, he added, that botany could contribute to the maintenance of standards for the purity of drugs.

MR. QUANT inquired as to the colour of the flowers in the specimens brought to the meeting by the author.

MR. DEWAR: Yellow.

MR. CHAMINGS pointed out that the activity of *D. lanata* was considered to be from two to five times greater than that of *D. purpurea*. Was the new principle isolated a specific substance?

MR. ROWSELL congratulated the author on his clear delivery—a matter in which many scientists failed to give satisfaction.

REPLY

MR. DEWAR, in a brief reply, said they could rely with safety on two characters for *D. lanata*. There were morphological, but not microscopical, differences between first-year and second-year leaves. According to the literature the physiological potency was from two to five times that of *D. purpurea ;* and he would look further into the nature of the new principle isolated. He thanked Mr. Rowsell, and also Mr. Wallis, for help and encouragement.

The next paper was on:—

The Determination of Phosphorus in Phosphate, Hypophosphite and Glycerophosphate Syrups

By G. J. W. FERREY

[ABSTRACT]

THE statement in the Conference Research List that a rapid method for the determination of phosphate in iron phosphate syrups is required prompted a trial of the volumetric molybdate method, which is generally conceded to be the most rapid form of phosphate determination.

The principle of the volumetric molybdate method, as introduced by Pemberton, is the precipitation of the phosphate as ammonium phosphomolybdate in the presence of nitric acid and ammonium nitrate, solution of the precipitate in standard alkali, and titration of the excess of alkali by standard acid. The equation involved is:—

$$2(NH_4)_3PO_4.12MoO_3 + 46NaOH = 2(NH_4)_2HPO_4 + (NH_4)_2MoO_4 + 23Na_2MoO_4 + 22H_2O.$$

Each atom of phosphorus thus requires 23 molecules of sodium hydroxide.

After some experiment, the following general method was found to give satisfactory results:—

An amount of material corresponding to 15 to 20 mgm. of P_2O_5 is dissolved in 70 mils of water, 5 mils of nitric acid is added and 10 gm. of ammonium nitrate, and the temperature raised to 65° C. To the stirred solution is then added, in a thin stream, 35 mils of nitric acid solution of ammonium molybdate. The mixture is stirred for a further 30 seconds, allowed to stand at a temperature of 65° to 70° C. for fifteen minutes, removed from the water bath and allowed to cool for a further fifteen minutes, the supernatant liquid being then filtered off through an asbestos or paper pulp filter in a Gooch crucible under slight suction. The precipitate is washed, as far as possible by decantation, with two 20-mil portions of 5-per-cent. nitric acid, then with five 20-mil portions of 5-per-cent. ammonium

BRITISH PHARMACEUTICAL CONFERENCE 1934

nitrate solution, and finally with small quantities of water. The final washings should not redden litmus paper. The precipitate is transferred to the original beaker, the crucible being washed out with about 50 mils of water, 50 mils of $N/5$ sodium hydroxide (free from carbonate) is added, the yellow precipitate allowed to dissolve completely, and the excess of alkali titrated with $N/5$ hydrochloric acid, using thymol blue or phenol violet to the yellowish-green tint as indicator.

The precipitate assumes an easily filterable form, and the supernatant liquid is quite colourless. The nitric acid solution of ammonium molybdate prescribed under the Fertilisers and Feeding Stuffs Act, 1926 (Statutory Rules and Orders, 1928, No. 421), gave satisfactory results providing it was kept in a warm place for seven days before use. If used immediately it gives high results, whilst a white or cream-coloured precipitate forms for some time after making but does not continue to do so after the first week after keeping in a warm place. The molybdate reagent of Etheridge (prepared from ammonium molybdate instead of molybdic acid) is free from the precipitation disadvantage, but contains considerably less ammonium nitrate, which is rectified by adding a further 5 gm. of ammonium nitrate to phosphate solution prior to adding the reagent. The end-point is somewhat spread out owing to the molybdate having a slight buffering effect. Phenolphthalein, which is usually recommended as indicator, gives rather low results, but the yellowish-green tint of phenol violet or of thymol blue corresponds closely with the theoretical end-point and is fairly readily detected.

Phosphate Syrups.—The method may be applied direct to phosphate syrups as none of the ingredients interfere with assay, about 0.4 gm. of syrup being taken. Results of five experimental assays gave 2.402 to 2.416 per cent. (w/v) of phosphorus against the theoretical amount of 2.35 to 2.40 per cent. In the case of syrup of ferrous phosphate with quinine and strychnine it is necessary to remove the alkaloids which are precipitated as phosphomolybdates. About 0.5 gm. of syrup is weighed into a small separator, 20 mils of water and 1 gm. of sodium citrate added before making distinctly alkaline with ammonia. The alkaloids are shaken out with chloroform in the usual way, washing the chloroform extracts with a little water. The bulked solutions are made slightly acid with nitric acid and warmed on a water bath to remove chloroform. Assay is proceeded with as above after adjusting the temperature to about 65° C. Two samples assayed 1.938 and 1.946 per cent. of phosphorus (w/v) against the calculated 1.95 to 1.993 per cent. Alternatively, the method below for hypophosphite syrup may be used.

Hypophosphite Syrups.—With compound syrup of hypophosphites, B.P.C., treatment with nitric acid followed by permanganate was found necessary to ensure complete destruction of the alkaloids quinine and strychnine. One to 1.5 gm. of the syrup is taken and treated in a Kjeldahl flask with 5 mils of nitric acid admixed with 5 mils of water. It is then carefully boiled down until the volume is reduced to between 3 and 4 mils. Then 5 mils of water and 0.5 gm. potassium permanganate are added and the mixture evaporated to about 3 mils. The contents of the flask are then washed into a beaker and excess of permanganate destroyed by a little oxalic acid before proceeding to assay by the general method. Two samples assayed 0.0976 to 0.979 per cent. (w/v) phosphorus against the calculated 0.995 from the B.P.C. formula.

Glycerophosphate Syrups.—Oxidation with nitric acid and sulphuric acids gave low results owing to failure to split the glycerophosphate radicle, and attention was directed to ignition methods. Good results were obtained by adding 0.5 gm. of magnesia and 15 gm. of ammonium nitrate (20 gm. when using Etheridge reagent) to the syrup, and after drying on a water bath, carefully igniting the mixture in a covered platinum crucible. A white ash is readily obtained which is soluble to a clear solution in dilute nitric acid. The mixture, after adding the ammonium molybdate reagent, is allowed to stand for one hour before filtering off the ammonium phosphomolybdate. Assays on syrup of glycerophosphates, B.P.C., showed 0.768 to 0.770 per cent. (w/v) of phosphorus as compared with the theoretical 0.829 per cent., which agrees with the calcium glycerophosphate not being completely dissolved.

Comment

The Chairman said the paper was a very useful one, on a subject which appeared to have given some difficulty. He was glad the inclusion of the subject in the Conference research list had stimulated Mr. Ferrey to produce the paper.

There was no discussion.

The next paper, which was read by Dr. Hampshire, was on:—

A Note on the Sulphuric Acid Test for Liquid Paraffin

By C. H. Hampshire and G. R. Page

[Abstract]

The following test on liquid paraffin was included in the British Pharmacopœia, 1914:—"When 3 millilitres are heated with an equal volume of *sulphuric acid* in a test-tube placed in boiling *water* for ten minutes, and frequently shaken, the acid layer, after separation, is not darker than pale-brown." Criticisms were made that the description of the Pharmacopœial test was not sufficiently precise and that the description of the colour could be variously interpreted by different analysts. During the preparation of the B.P., 1932, some attempts were made to give greater precision to the test by providing a colour standard, but the time available was not sufficient to allow an accurate test to be devised. The test is, therefore, repeated in the B.P., 1932, with the small refinement that nitrogen-free sulphuric acid is stipulated. The authors then give suggested colour standards which were tried. None of these proved entirely satisfactory. It is, however, frequently observed that the tint produced by the action of sulphuric acid on liquid paraffin varies for different samples. In some instances a brownish colour predominates and in others a reddish tinge is apparent. In August, 1932, the United States of America Treasury Department issued a definition of the "pale amber" colour required by the United States Pharmacopœia X test, which is similar to that of the British Pharmacopœia. (The definition is then given.) This test, the authors state, appears to be liable to error. It was therefore concluded that a better line of inquiry would be the analysis of the colour in terms of the Lovibond series of coloured glasses and the matching of the test liquid in the tintometer. The depth of colour produced by the action of sulphuric acid on liquid paraffin is influenced by a number of factors, all of which must be standardised in any definition of a test which is to be used by a number of analysts working in different laboratories. The factors are as follows:—(*a*) *The strength of the sulphuric acid;* (*b*) *the presence of nitric acid in the sulphuric acid;* (*c*) *the temperature of heating;* (*d*) *the time of heating;* and (*e*) *shaking.* After a number of preliminary trials the following description was drafted and issued for comment to members of a subcommittee of the Pharmacopœia Commission:—

Reagent.—Nitrogen-free sulphuric acid of reagent purity containing 96 per cent. w/w of H_2SO_4.

Quantities.—5 millilitres of the sample and 5 millilitres of the reagent.

Tube.—A glass-stoppered test-tube 120 mm. in length and 20 mm. in internal diameter, graduated at 5 and 10 millilitres.

Procedure.—Rinse the tube with the reagent and allow to drain. Place 5 millilitres of the reagent and 5 millilitres of the sample in the tube, insert the stopper and shake vigorously for five seconds. Loosen the stopper, place the tube immediately in a boiling water bath, and heat for ten minutes. At the end of the second, fourth, sixth and eighth minutes remove the tube from the bath and shake vigorously for five seconds. At the end of ten minutes transfer the liquids to a small, dry separator with ungreased tap, allow to stand for ten minutes and run off the lower layer into a 1 cm. all-glass

BRITISH PHARMACEUTICAL CONFERENCE 1934

rectangular Lovibond cell. Match the colour against standard Lovibond glasses.

Strict observance of detail is essential.

The following suggestions were received for additions to and variations in the details of the description:—The tube must be dry before rinsing with sulphuric acid; the quantity of sulphuric acid used for rinsing should be stated; the time for draining should be stated; the manner of shaking should be more clearly indicated; each period of shaking should be 10 seconds, 5 seconds being considered rather short, as the first second or two are taken up with getting the liquids into an emulsified condition and closer contact is only obtained during the last three or four seconds.

The authors record their results as follows:—Seventeen samples of liquid paraffin were obtained from various sources and the results are tabulated below. In nearly all instances the colour could be accurately matched with red and yellow glasses, but with two samples blue glasses of low value were also necessary. The agreement obtained in successive tests by this technique is shown by the following results of successive tests on two samples:—

TABLE I.

Sample p. 7.

Test	Red	Yellow	Blue
1	1·3	3·0	—
2	1·4	3·1	—
3	1·4	3·2	—
4	1·3	3·0	—

Sample p. 9.

Test	Red	Yellow	Blue
1	1·5	4·0	—
2	1·5	3·9	—
3	1·5	3·9	—
4	1·5	4·0	—

Average figures for four or five tests on each sample are shown in Table II.

TABLE II.

No.	Source	Description	Red	Yellow	Blue
P. 3	Manufacturer	Complies with B.P. 1932 test.	2·0	5·1	—
P. 4	Manufacturer	Border-line. Maximum colour permissible.	4·3	18·1	—
P. 5	Manufacturer	Unacceptable as B.P.	5·9	29·8	—
P. 2	Wholesale house No. 1.	Bought as B.P. 1932	2·9	8·0	—
P. 6	Wholesale house No. 1.	Complies with B.P. 1932 test.	2·4	6·2	—
P. 7	Wholesale house No. 1.	Complies with B.P. 1932 test.	1·3	3·1	—
P. 1	Wholesale house No. 2.	Bought as B.P. 1932	4·3	12·0	—
P. 8	Wholesale house No. 2.	Complies with B.P. 1932 test.	1·5	3·7	—
P. 9	Wholesale house No. 2.	Complies with B.P. 1932 test.	1·5	3·9	—
P. 10	Wholesale house No. 2.	Complies with B.P. 1932 test.	1·1	2·6	—
P. 11	Wholesale house No. 2.	Complies with B.P. 1932 test.	1·5	3·8	—
P. 12	Wholesale house No. 2.	Does not comply with B.P. 1932 test.	6·1	25·0	—
P. 13	Wholesale house No. 3.	Complies with B.P. 1932 test.	2·1	6·2	—
P. 14	Wholesale house No. 3.	Complies with B.P. 1932 test.	2·3	6·4	0·1
P. 15	Wholesale house No. 3.	Does not comply with B.P. 1932 test.	Dark brown colour, not measured.		
P 16	Wholesale house No. 3.	Does not comply with B.P. 1932 test.	4·3	17·8	0·2
P. 17	Wholesale house No. 3.	Does not comply with B.P. 1932 test.	Dark brown colour, not measured.		

SUMMARY

The sulphuric acid test for liquid paraffin has been criticised on the grounds that the Pharmacopœial description of the details of the test is not sufficiently precise and the description of the colour is capable of different interpretation by different workers. An attempt is made to state a test which will give the same results in the hands of different analysts. The technique is described in minute detail and the necessity for meticulous observance of details is stressed. The colour obtained is expressed in terms of the Lovibond series of the coloured glasses. Comments and criticisms are invited with a view to producing a precise description of the test and to fixing a colour standard. From the laboratory of the British Pharmacopœia Commission.

DISCUSSION

THE PRESIDENT (who temporarily took the chair) said they had listened to an interesting paper on an interesting subject. Dr. Hampshire's paper showed that to "standardise the standard" was very necessary.

MR. EVERS congratulated the authors on useful work in helping to standardise this test. He would like to know the relation of the amount of colour to the taste and viscosity of these samples. Some colour seemed to be produced by very pure samples of paraffin.

MR. POWELL said the colour test in liquid paraffin had always been difficult to put down in suitable form. The amount of shaking and the strength of sulphuric acid were very important. He preferred shaking for a longer period than five seconds. He asked Dr. Hampshire if the test had been carried out on samples which had been stored in the shop for some time. Paraffin, he said, might be pure when fresh, but when kept in a warm place for several months it deteriorated.

MR. F. C. J. BIRD recalled that it was in a Conference paper that the presence of sulphur in liquid paraffin was pointed out by him. He was pleased to notice the tendency to adopt standardisation by colour. The paper was a very useful one.

REPLY

DR. HAMPSHIRE, in reply, said they regarded the paper as a preliminary note. Mr. Powell's remarks had brought out the necessity for a standard way of working. The strength of acid was important, and when they had used 98 per cent. acid the difference in colour was striking. They had not investigated old samples. He was particularly glad that Mr. Bird had joined in the discussion. (Applause.)

THE PRESIDENT said the Conference greatly appreciated the paper.

The last paper taken at this session was:—

Notes on some Pharmacopœial Tests

By G. R. PAGE

[ABSTRACT]

THE notes are published on the instruction of the Pharmacopœia Commission with the object of securing comment and criticism.

Melting Point of Quinine Ethyl Carbonate.—The pharmacopœial requirement that this compound does not melt below 95° C. has been the cause of difficulty in commerce. The conclusions arrived at from tests of three commercial products (as received and after drying by various methods) are as follows:—

(1) The official melting point appears to be too high. The dried salt melted between 90° and 92° C., which was raised to 91.5°-92.5° C. by recrystallisation.

(2) The m.p. of the undried substance is higher than that of the dried salt, and the final m.p. may be above 95° C.

(3) The presence of impurity lowers the m.p., which is not sharp.

(4) The method of drying and the temperature of the melting bath have little effect on the figures obtained.

Water Content of Atropine Sulphate.—Four determinations were made on three specimens, the average of

BRITISH PHARMACEUTICAL CONFERENCE 1934

the results being given in the following table:—

Sample	Average loss at 105° C.	Average loss at 136° C.	Difference
A.1	2·89 per cent.	4·23 per cent.	1·34 per cent.
A.2	2·36 per cent.	3·11 per cent.	0·75 per cent.
A.3	2·94 per cent.	3·26 per cent.	0·32 per cent.

It thus appears that a considerable proportion of water (which varies with different samples) is retained after drying at 105° C. The total loss at 136° C. was in all cases greater than the proportion 2.59 per cent. required by the formula for the monohydrate. Samples A1 and A3 gave a loss at 105° C., which was very close to the official maximum of 3 per cent. Sample A2 showed varying results in repeated experiments at 105° C., but constant results at 136° C. It is concluded that the drying of atropine sulphate may be far from complete, at 105° C., and that a moisture determination carried out at 136° C. would be a better test for purity.

Test for Ammonium Alum in Potassium Alum.—Manufacturers suggest that an amount not exceeding 2½ per cent. of ammonium alum should be permitted in potassium alum. The following limit test (suggested by Mr. T. T. Cocking) allows of the presence of 2.67 per cent. of ammonium alum in potassium alum.

Dissolve 1 gm. in 1000 mils of ammonia-free water; to 10 mils of the solution add 40 mils of ammonia-free water and 2 mils of alkaline solution of potassio-mercuric iodide. Any colour produced is not deeper than that given by 1 mil of dilute solution of ammonium chloride (Nessler's) in 50 mils of ammonia-free water to which 2 mils of alkaline solution of potassio-mercuric iodide has been added.

It is important that the reagent should be added to both the sample and the standard at the same time and the colour produced examined after a definite lapse of time. Five minutes is suitable.

Limit Test for Water-insoluble Matter in Aloin.—The test has been criticised on the ground that the purer samples of aloin do not comply with it. Experiments showed that unduly high results may be due to aloin not dissolving completely at 15.5° C., the purer aloins (freer from soluble extractive matter) being more difficult to dissolve. Of ten samples, only one complied with the official test at 15.5° C., but all were satisfactory when this was carried out at 25° C., as in the U.S.P. X. The following wording is suggested for the test:—

Place 1 gm. in a stoppered flask with 120 mils of *water* at 25° and shake frequently during two hours, maintaining the temperature at 25° throughout; filter through a Gooch crucible which has been prepared with asbestos, dried at 100° and tared, wash the residue on the filter with 25 mils of water, and dry at 100°; the residue weighs not more than 0.015 gm.

The use of a Gooch crucible replaces a tared filter paper as the hygroscopic character of the latter leads to variable results. The water is reduced from 130 mils to 120 mils to bring the test into line with that of the U.S.P. X.

Miscibility of Lysol.—Much of the cresol on the market does not produce a solution of cresol with soap complying with the pharmacopœial requirement of miscibility in all proportions with water. The cresols which produce miscible products are understood to be deficient in meta-cresol, the most active bactericidal constituent. Therefore a soluble lysol means a less efficient lysol. Examination of various makes of lysol showed that these gave clear solutions with water when the lysol was over 50 per cent. or under 20 per cent. Two of the five samples were cloudy at 30-per-cent. dilution, separating into two layers on standing, but clear solutions are obtainable by raising the temperature sufficiently (in one case to 22° C. and the other to 32° C.). All the samples were miscible with alcohol (95 per cent.) at all dilutions from 1 to 99 per cent. However, none complied with the B.P. requirement of miscibility with ether in all proportions. Solutions weaker than 30 per cent. were turbid, varying from opalescence to formation of a white gelatinous mass. Lysol supplies from large makers thus do not conform with B.P. requirements. Though the miscibility statements appear under "Characters" and not under "Tests for Purity," difficulties have arisen in commerce.

Summary

(1) The melting point of quinine ethyl carbonate requires revision.

(2) The water content of atropine sulphate should be determined by drying at 136° C. instead of 105° C.

(3) A test for potassium alum is proposed which allows the presence of 2.67 per cent. of ammonium alum.

(4) The limit test for water-insoluble matter in aloin is unsatisfactory at 15.5° C., but accurate results are obtained at 25° C.

(5) The B.P. "characters" for miscibility are inapplicable to the better makes of lysol.

Discussion

Mr. Linstead said that he had had some experience with what were known as lysol solutions. There were two distinct types of these, one black and strong-smelling, the other clear and lighter in colour. Had the author examined any of these solutions?

Mr. Gading asked whether the soap present was a factor in the miscibility with water.

Mr. A. J. Jones, after remarking that lysol was an annoying substance to manufacturers and pharmacists, said that it was of composite character and they could not have all the desirable points. They must decide what characters were best in an official lysol—high disinfectant power or good miscibility. Soap was a variable factor; it could be blended, with different results in miscibility with waters, and in different dilutions. There appeared to be a demand for a 1 : 3 lysol in hospitals and other institutions.

The Chairman inquired whether it was necessary to go outside the Pharmacopœia specification for soaps.

Mr. Jones suggested that, having produced a lysol to order, a manufacturer had trouble in other specifications; therefore a universal lysol could not be formulated.

Mr. Powell pointed out that the characters in the author's monograph were differently drawn up from those in the Pharmacopœia. One was liable to get a lower coefficient with a miscible lysol.

Mr. Jackson thought it would be necessary to apply bactericidal standards in the Pharmacopœia. Oleic acid could be used to form the soap required. The solubility proposed seemed unnecessarily stringent.

Mr. A. J. Jones remarked that whereas in earlier days a coefficient of nearly 4.0 could be obtained with lysol, present-day samples were down to about 1.8. Manufacturers were offering B.P. specification cresol, but the finished products differed.

Mr. Evers inquired whether the author had investigated the miscibility of lysols from the point of view of the three isomers present.

Mr. Corfield raised the question of the solubility of aloin in water. It was erroneous, he said, to bring an argument to lead to the belief that dissolving at 15.5° C. was essential. It was well known that the solubility depended largely on the temperature; and a recent article in "The Journal of the American Pharmaceutical Association" showed that aloin, though insoluble at 15°, would be almost entirely soluble at a higher temperature. The new British Pharmaceutical Codex would contain a statement to this effect.

Mr. Walmsley pointed out that the kind of filter-paper used made a great deal of difference in these determinations.

Mr. Withell inquired if there were differences with aloins obtained from different kinds of aloes, and whether the residues were tested.

Reply

Mr. Page, replying to the discussion, said that the use of tared filter paper in aloin determinations was not satisfactory. A Gooch crucible was quicker and better. He believed that commercial aloin was all, or practically all, obtained from Curaçao aloes. He had tested

BRITISH PHARMACEUTICAL CONFERENCE 1934

the residues to some extent, with inconclusive results. Turning to the lysol problems, he had not examined any solutions. Soap could make a difference, and there seemed to be a critical temperature for each solution. He believed that the use of concentrated solutions of lysol was quite small. All his tests had been made with distilled water. He had not examined thoroughly the point raised by Mr. Evers, but if the proportion of metacresol was high the product was not miscible in all proportions.

THE CHAIRMAN thanked the authors of the papers, and the session was adjourned to the afternoon.

Science Section

Tuesday Afternoon

A fair number of members answered the call of the chairman on Tuesday afternoon, though the majority were engaged at the delegates' meeting in another lecture theatre of the University.

The first paper taken was:—

The Preparation of Sterile Solutions

By H. DAVIS

[ABSTRACT]

A SYNOPSIS of the sterilisation methods adopted in different national pharmacopœias shows a divergence in the means for producing sterile solutions, a lack of unanimity being evident. Autoclaving and tyndallisation are accepted by most as effective procedures, but there is considerable variation in other methods. No further investigation has been made of the efficacy of autoclaving as innumerable tests have been applied to autoclaved products. Exposure to streaming steam was examined, as it obviates the chief disadvantages of boiling (the use of heat-resisting vessels and adjustment to volume after heating). It is well known that a single steaming cannot be completely relied upon, but little information exists in regard to bacteriological examination of hypodermic solutions sterilised by steaming. Preliminary experiments with three solutions (atropine sulphate, 0.12 per cent.; codeine phosphate, 5 per cent.; and normal saline solution) showed that a non-sporing organism (*Staphylococcus aureus*) was killed by steaming for five minutes, but fifteen minutes was inadequate with sporing organisms (*Bacillus mycoides* and *B. subtilis*). In every case sterile products were obtained after thirty and sixty minutes' steaming. Cultural tests on solutions infected with dust from straw packing and with *Clostridium sporogenes* showed sterilisation with thirty or sixty minutes' steaming except in the case of 12 per cent. of sodium thiosulphate solution in which thirty minutes' steaming did not kill the sporing anaerobe. Soluble phenobarbitone decomposes during steaming, and obviously should not be subjected to such sterilisation process. In the final series of tests it was decided to adopt sixty minutes as the period for sterilisation by steaming. Solutions were prepared with distilled water in vessels, scrupulously cleaned but not sterilised. These were transferred to 25-mil vaccine bottles and plugged with non-absorbent cotton-wool. The infecting organisms for the steaming process were *B. subtilis, Cl. sporogenes* and a filtrate prepared from farm-yard soil containing straw, stable and poultry manure. A little of this soil was triturated with water and filtered through a coarse filter-paper. After boiling a little for seventy-five minutes the liquid was not sterile. As a control a little was mixed with broth and steamed for sixty minutes. On incubation copious growth occurred. Plating and growth in anaerobic tubes showed the presence in the unheated filtrate of coliform and subtilis-type bacteria and gas-producing anaerobes. Contamination of injections with this material was therefore considered to be a stringent test, the conditions being much worse than any which would be experienced by a person engaged in preparing hypodermic solutions. The *p*H of the solutions, both before and after steaming, was determined as appreciable changes would probably indicate a certain degree of decomposition. Comparative results are given in Table I:—

TABLE I.

Solution	Steamed for 60 mins.				Tyndallised		PH	
	Soil filtrate		*B. subtilis & Cl. sporogenes*		*B. subtilis & Cl. sporogenes*			
	Aerobic	Anaerobic	Aerobic	Anaerobic	Aerobic	Anaerobic	Before steaming	After steaming
0·12 per cent. atropine sulphate	—	—	—	—	+	+	6·6	6·4
5 per cent. codeine phosphate	—	—	—	—	+	+	4·7	4·7
25 per cent. caffeine sodium benzoate ...	—	—	—	—	+	+	8·0	8·0
Normal saline solution	—	—	—	—	+	+	7·0	7·0
5 per cent. dextrose ...	—	—	—	—	+	+	7·0	6·0
0·6 per cent. homatropine hydrobromide...	—	—	—	—	+	+	6·4	6·0
2 per cent. procaine hydrochloride ...	—	—	—	—	+	+	6·0	4·2
3 per cent. pilocarpine nitrate	—	—	—	—	+	—	4·7	4·2

The remarkable fact is evidenced that the tyndallisation process of maintaining at 80° for one hour on three successive days is useless when applied to spore-infected material, whereas steaming for one hour in every case produced a sterile product. In view of the British Pharmacopœia not specifying the application of sterility tests to tyndallised products it is evident that in order to place any reliance on the method the solutions *should be prepared with aseptic precautions in previously sterilised*

TABLE II.

Solution	Steaming for 60 mins.				Tyndallised *B. subtilis & Cl. sporogenes*				PH	
	Soil filtrate		*B. subtilis & Cl. sporogenes*		Without incubation		With incubation			
	Aerobic	Anaerobic	Aerobic	Anaerobic	Aerobic	Anaerobic	Aerobic	Anaerobic	Before steaming	After steaming
20 per cent. hexamine	—	—	—	—	—	—	—	—	8·2	9·4
5 per cent. amylocaine hydrochloride	—	—	—	—	—	—	—	—	4·9	4·2
10 per cent. medinal	—	—	—	—	+	—	+	—	9·4	9·4
30 per cent. dextrose	—	—	—	—	+	—	+	—	6·6	4·6
5 per cent. calcium chloride	—	—	—	—	+	—	+	—	7·2	7·4
12 per cent. sodium thiosulphate	—	—	—	—	+	—	+	—	7·4	7·4
2·5 per cent. morphine hydrochloride	—	—	—	—	+	+	+	+	4·8	4·8
2·5 per cent. morphine tartrate	—	—	—	—	+	+	+	+	6·0	6·0
5 per cent. peptone	—	—	—	—	+	+	+	+	6·0	5·8
0·75 per cent. strychnine hydrochloride	—	—	—	—	+	+	+	+	5·6	5·6
40 per cent. phenazone	—	—	—	—	—	+	—	+	6·4	7·0
30 per cent. sodium salicylate	—	—	—	—	—	+	+	+	4·4	4·4

BRITISH PHARMACEUTICAL CONFERENCE 1934

containers before submitting them to the stages of successive heatings. In the remaining series (Table II) a further step was introduced into the tyndallisation process, a duplicate batch being incubated between the periods intervening between the successive heatings, a thermometer through the rubber cap of a vaccine bottle being used to ascertain that the temperature reached 80° and was maintained at 80° to 85° C. for one hour.

Because of the negative results of the anaerobic tests with incubation after tyndallisation of the first six injections in Table II a test was made on the broth culture itself. The result showed that the organism had died in this without the application of heat, although it was a living culture when introduced into the solutions. Unfortunately it was not possible to repeat these tests in the time available. The aerobic tests on the first six demonstrated that only two were sterile, and it is highly probable that when the anaerobic tests are repeated the result will be different from those previously obtained. The solution of hexamine was sterile after tyndallisation, which supports the view that the decomposition products render the solution sterile after a slight degree of heating. That decomposition does occur to some extent on steaming is evidenced by the change in *p*H from 8.2 to 9.4 and the positive result with Zesoler's solution on the steamed product. The results in the case of procaine hydrochloride, pilocarpine nitrate, dextrose and amylocaine hydrochloride appear to indicate some decomposition. The change in *p*H of procaine hydrochloride confirms previous results, but the writer is not convinced that the degree of decomposition is sufficient to condemn this method of sterilisation. In regard to amylocaine hydrochloride there appears to be more justification for condemnation.

During the progress of this paper the writer was called upon to supply 50-mil ampoules of 50-per-cent. dextrose solutions. In accordance with official directions these were autoclaved. On removal from the autoclave the solutions were deep yellow in colour due to caramelisation, and would obviously have been condemned by the surgeons for whose use they were intended. The tyndallisation process in conjunction with aseptic methods of preparation was therefore applied for all concentrated solutions of dextrose. A series of solutions of 5, 10, 15, 20, 25, 30 and 50 per cent. strength was prepared and sterilised in the autoclave. Above a concentration of 10 per cent. the solutions were coloured, the intensity increasing with concentration. The colour is also influenced by the reaction of the glass, and if this is alkaline the degree of caramelisation is considerably increased. It would therefore seem advisable for the British Pharmacopœia to stipulate a limit of 10-per-cent. concentration for solutions to be sterilised in the autocrave. Steaming of a 30-per-cent. solution for an hour produces no visible coloration and, as results have shown, the solution has been sterile even when prepared under conditions of gross contamination. The change in reaction is also greater in the autoclaved solution as shown by the following results:—

TABLE III.—PH OF DEXTROSE SOLUTIONS

Concentration	PH before sterilisation	PH after steaming	PH after autoclaving
5 per cent. ...	7·0	6·0	4·6
30 per cent. ...	6·6	4·6	4·4

Suggestions have been made that sufficient di-sodium hydrogen phosphate should be added to buffer solutions of dextrose to maintain a *p*H of 7.

SUMMARY

Bacteriological experiments have been made on a number of hypodermic injections showing that, even in the presence of contamination much worse than that obtaining during any dispensing operation, sterile products can readily be obtained by exposure to streaming steam at atmospheric pressure for one hour.

The instructions prescribed by the British Pharmacopœia for sterilisation by tyndallisation are inadequate and sterility is not assured. When solutions are incubated during the intervals between successive heatings, the nature of most of the common solutes is such that spores do not pass into the vegetative state and are consequently not destroyed when exposed to a temperature of 80° C. and maintained at 80° to 85° C. for one hour on three successive days.

The *p*H of a number of common hypodermic solutions before and after steaming for one hour shows evidence of decomposition of the solute in certain cases.

Results during sterilisation of solutions of dextrose suggest that concentrations in excess of 10 per cent. should not be sterilised by autoclaving at 10 lb. per sq. in. pressure.

DISCUSSION

THE CHAIRMAN said this was an important subject in a field in which a great deal of work could be done. It was interesting to note that in some foreign pharmacopœias the process of tyndallisation varied. The effect of tyndallisation depended on the supposition that spores develop in circumstances in which they find themselves; sometimes, however, they did not, and that seemed to be the weak point of tyndallisation.

MR. COULTHARD paid a tribute to Mr. Davis for his work; the paper was very important and contained a lot of valuable information. In the investigation of sterility problems one was up against serious difficulties. One sometimes found spores which would withstand steaming for a considerable time. Another difficulty was in deciding what the standard should be; the standard should be absolute sterility, i.e. the product should be able to pass any test. This, unfortunately, was not always possible. There was also the question of tyndallisation to be considered. The tyndallisation process acted well in practice, was simple and had general applicability, which contrasted with the present restricted nature of boiling processes. When a pharmacist was called upon to dispense a sterile product which could not be heated or filtered, his success depended on attaining a high degree of manipulative skill.

MR. BERRY said the main value of the paper was that the process of stream-steaming was put forward on its merits. This method was a simple one for sterilising thermostable solutions. He had confirmed the results of Mr. Davis's experiments working on 1-per-cent. solutions of various drugs. All were agreed that stream-steaming, if it could be proved to be an adequate method of sterilisation, would be welcomed.

MR. CORRAN confined his remarks to the section devoted to the preparation of dextrose, especially with regard to colour. He had experimented with a solution of 50 per cent. dextrose with sodium citrate; the solution became acid when autoclaved as by the B.P. method. If sufficient citric acid was added before autoclaving, a water-white solution was obtained.

MR. PAGE referred to the specification for the sterilisation of dextrose in the Swiss Pharmacopœia.

MR. EVERS said the paper was very valuable. It seemed that any method of sterilisation recommended by the Pharmacopœia must be in the nature of a compromise.

PROFESSOR BURN congratulated Mr. Davis on his work.

MR. DAVIS briefly replied to the points raised and was thanked by the chairman.

The next paper, presented by Mr. Bernard Howard, was:—

A Note on Ferrous Chloride

By F. E. CARTER

[ABSTRACT]

IT has recently been suggested that ferrous chloride is the most suitable means of administering iron medicinally, but the instability of the salt, and of its solutions has, up to the present, prevented it being much used. An attempt has been made to make (1) a stable solution

BRITISH PHARMACEUTICAL CONFERENCE 1934

which will not oxidise or deposit; (2) a salt which will dissolve giving a clear stable solution; and (3) a tablet which is readily soluble in water giving a stable solution. The starting point of most of the experiments was crystallised ferrous chloride (iron protochloride) $FeCl_2$, $4H_2O$, the salt used being slightly overdried and containing 68.0 per cent. On dissolving in water, a very turbid solution was obtained, owing to the formation of basic ferric chloride. An attempt was first made to reduce ferric chloride by means of dextrose. It was found that no reduction took place in the cold, but that on boiling 100 mils of solution of ferric chloride B.P. with 10 gm. of dextrose for about two hours, complete reduction of the iron took place, and a perfectly clear solution was obtained, which remained clear on keeping. This stability could be due to one of two causes, namely, the presence of dextrose, or the increase of acidity due to the oxidation of the dextrose, or possibly both conditions may have been necessary. As, however, the acidity produced is probably due to a mixture of several acids, it was felt that such a condition was undesirable, and experiments were made with a view of obtaining similar conditions of stability, using an acid which is known to be harmless. Citric acid was the one decided upon. The possibility of dextrose alone being sufficient to prevent oxidation was investigated and it was found to be ineffective. A solution containing 25 gm. of crystallised ferrous chloride and 5 gm. of dextrose in 100 mils of water went turbid within a few hours, depositing a brown precipitate. Two series of solutions were next prepared, containing varying proportions of (1) ferrous chloride, dextrose, and citric acid; (2) ferrous chloride and citric acid alone. The solutions were left to stand in half-filled bottles, and tested periodically for ferrous content by titration with standard potassium dichromate solution. It was found that the amount of oxidation taking place in any of the experiments was so little as to be negligible, the solutions remaining perfectly bright for several weeks. There was apparently no advantage in the addition of dextrose, as will be seen on examination of the results shown in the following table:—

Amount of solids dissolved in 100 mils of water	Percentage w/v of ferrous chloride $FeCl_2$			
	Freshly made	After 1 week	After 1 month	After 2 months
25 gm. ferrous chloride, 5 gm. dextrose, 1 gm. citric acid ...	16·9	16·7	16·5	16·5
25 gm. ferrous chloride, 5 gm. dextrose, 2 gm. citric acid ...	17·0	16·6	16·5	16·5
25 gm. ferrous chloride, 5 gm. dextrose, 3 gm. citric acid ...	17·2	16·7	16·6	16·5
25 gm. ferrous chloride, 5 gm. dextrose, 4 gm. citric acid ...	16·6	16·4	16·1	16·1
25 gm. ferrous chloride, 5 gm. dextrose, 5 gm. citric acid ...	16·7	16·3	16·3	16·2
25 gm. ferrous chloride, 1 gm. citric acid	16·8	16·5	16·4	16·2
25 gm. ferrous chloride, 2 gm. citric acid	17·2	17·2	17·1	17·0
25 gm. ferrous chloride, 3 gm. citric acid	17·1	16·5	16·6	16·4
25 gm. ferrous chloride, 4 gm. citric acid	17·1	16·8	16·5	16·4
25 gm. ferrous chloride, 5 gm. citric acid	17·6	16·5	16·1	16·2

It will be seen that the addition of 1 per cent. w/v of citric acid is sufficient to give a perfectly stable solution of ferrous chloride. The two solutions containing (1) 5 per cent. of citric acid, and (2) 5 per cent. of citric acid and 5 per cent. of dextrose were evaporated to dryness at 100° C. In the first case, a salt containing 71.9 per cent. of $FeCl_2$ was obtained which gave a perfectly bright solution. During evaporation slight oxidation had taken place, however, for the total iron content corresponded to 75.4 per cent. of $FeCl_2$, a difference of 3.5 per cent. of $FeCl_2$. In the case of the solution containing dextrose, a salt containing 65 per cent. of $FeCl_2$ was obtained, which contained less than 1 per cent. of ferric chloride, but unfortunately did not give a clear solution, considerable charring of the dextrose having taken place during evaporation. If solutions containing less than 5 per cent. w/v of citric acid are evaporated, the resulting products contain a larger proportion of ferric chloride, and their solutions are not bright. It seems, therefore, to be necessary to have at least 5 per cent. w/v of citric acid in a solution if it is desired to give a satisfactory salt on evaporation to dryness. Attempts were next made to make ferrous chloride tablets using citric acid as a preventive against oxidation, and it was found that starting from ferrous chloride crystals $FeCl_2$, $4H_2O$, and adding 8 per cent. by weight of citric acid, with dextrose as the excipient, a stable tablet containing 3 grains of anhydrous ferrous chloride, and weighing 4.5 grains, could be prepared. These tablets were readily soluble in water giving a clear stable solution, and there was no sign of any deterioration in the tablets after keeping for several weeks.

Summary

It has been shown that solutions of ferrous chloride, to which 1 per cent. w/v of citric acid has been added, will not oxidise and will remain bright for a long period. If 5 per cent. w/v of citric acid is used, the solution can be evaporated, and a salt obtained which can be redissolved to give a clear stable solution. Further, ferrous chloride can be made into tablets by using 2 parts of citric acid to 25 parts of ferrous chloride, using dextrose as excipient. These tablets readily dissolve, giving a bright solution. From the laboratories of Howards & Sons, Ltd., Ilford.

Discussion

The Chairman, in opening the discussion, remarked that this was a very interesting problem with a very satisfactory solution. It was agreed that ferrous salts were preferable in medicine, especially in view of the growing practice of giving large doses. How did citric acid act in preventing oxidation?

Mr. Berry said that, according to a paper in the "Journal of the Chemical Society," ferrous sulphate kept best in an acid solution.

Mr. Howard, in reply, suggested that the author or some other investigator might be able to supply an answer to the question on the action of citric acid, a point which was not a part of the original problem set. As to Mr. Berry's analogy, ferrous sulphate was a fertile source of complaints from indignant retailers, and manufacturers who wished to enter into acrimonious correspondence should try it. (Laughter.) The narrow limit of acidity laid down probably increased the trouble.

The author was thanked by the chairman.

The next paper taken was:—

The Seasonal Variation of Santonin in Scottish Artemisias

By James Coutts

[Abstract]

In a previous paper it was shown that a species of *Artemisia* growing wild on the east coast of Scotland contained an appreciable proportion of santonin. It has now been found that there are two species of *Artemisia, A. maritima,* Linn., and *A. gallica,* Willd., present in this locality, the latter preponderating largely. By some authorities *A. gallica,* Willd., is considered to be a variety of *A. maritima,* Linn. In 1929 the air-dry leaves from a batch of plant collected in July of that year were found to contain 0.81 per cent. of santonin, and in pursuing the investigation it was decided to determine not only the maximum percentage of santonin produced by the plant but to observe the seasonal variation in relation to the stage of growth, and also the proportion present in different organs of the plant in the batches collected. With this end in view collections of material at successive growth stages was commenced in May 1930, and continued until 1932. Root, stem, leaf and flowerhead of the plant were separated wherever possible, but santonin

BRITISH PHARMACEUTICAL CONFERENCE 1934

was not found to be present at any time in the root or woody stem. The method of assay used during 1930 and 1931 was that of Fromme. In 1931 a new process, specially adapted for the examination of the type of drug under investigation, was devised by the author and used during 1932. This process was found to be more useful than any of the other published processes, and can be used for the examination of all types of drug including those with a low santonin content. The accuracy of the results obtained using it has been confirmed by other workers.

In 1932 batches of the plant were systematically collected at frequent intervals. On each occasion two batches at different stages of growth were obtained, one batch being taken from the south and more sheltered side and the other, not quite so far advanced, from other parts of the area. The same precautions as were previously taken, to ensure that the plants in each collection were at the appropriate stage of growth in relation to the time which had elapsed from the previous collection, were again taken. Eleven batches were collected for each of the two series. The results are shown in the following table:—

PERCENTAGE OF SANTONIN IN 1932 AIR-DRY HERB

Series I

Batch number	Date of collection	Part of plant used		
		Leaves and fine stems	Leaves and flowerheads	Flowerheads
1	June 23 ...	0·59	—	—
2	July 9	0·97	—	—
3	July 23	1·22	—	—
4	July 30	1·33	1·33	—
5	August 8 ...	—	1·24	—
6	August 15 ...	—	1·04	0·67
7	August 20 ...	—	0·75	0·725
8	August 27 ...	—	0·70	0·985
9	September 2 ...	—	0·87	1·13
10	September 9 ...	—	1·09	1·09
11	September 20 ...	—	—	0·54

Series II

1	June 23 ...	0·55	—	—
2	July 9	0·885	—	—
3	July 23	1·32	—	—
4	July 30	1·60	1·60	—
5	August 8 ...	—	1·54	—
6	August 15 ...	—	1·30	0·695
7	August 20 ...	—	0·90	0·85
8	August 27 ...	—	0·86	1·06
9	September 2 ...	—	0·975	1·22
10	September 9 ...	—	1·16	1·17
11	September 20 ...	—	—	0·875

With the expansion of the flowerheads the decrease was rapid and in a few days the santonin had practically disappeared.

The plants cultivated at Corstorphine were collected in four batches at about eleven-day intervals in 1932. It was hoped that there would be sufficient material for a larger number of collections, but the plant spread only a little and there was only sufficient for the four collections. Complete data regarding the variation in santonin content in the cultivated plant are, therefore, not available. It has, however, been shown that the plants continued to produce santonin in their third year of cultivation, although the yield is not so high as that from the wild plant at, as nearly as possible, the same stage of development.

A collective study of the six graphs obtained from these assays shows that they are all similar in nature, and show a rapid rise to a maximum. The fall from the maximum is followed by a subsidiary maximum, after which the santonin rapidly disappears completely. During the fall from the primary maximum, the santonin content of the flowerheads alone is shown to rise, but commences to fall again at the same time as the fall from the secondary maximum in the leaves and flowerheads commences. Collections from other stations for the plant, while providing records not so complete as those for Tynefield nor showing such high contents, do give curves very similar to those constructed from the Tynefield data. (The original paper contains nine tables.)

SUMMARY AND CONCLUSIONS

1. Plant material growing in Scotland previously reported to contain santonin has been identified as *A. gallica*, Willd., and *A. maritima*, Linn.

2. *A. gallica* from this area yields a good proportion of santonin, almost 2 per cent. having been found to be present.

3. *A. maritima* also yields a good proportion of santonin, but the growth of this species in this area is not nearly so abundant as that of *A. gallica*.

4. The santonin content shows a regular seasonal variation, with two maxima on the curve representing the variation.

5. The maximum percentage of santonin is to be found in the leaves immediately before flowerheads become conspicuous.

6. The second maximum on the curve is not so great as the first, and occurs just before the flowerheads commence to expand.

DISCUSSION

THE CHAIRMAN referred to a previous paper on this subject presented by the author at the Aberdeen Conference in 1932. He (the chairman) would be interested to know what bearing this research had on the commercial prospects of santonin extraction in this country.

MR. SABER inquired whether cultivation affected the percentage of santonin, and whether there was the same variation in cultivated as in wild plants.

MR. CORFIELD pointed out that the author's paper confirmed work now being done in India. He was not quite satisfied that Dr. Coutts had done justice to the santonin content of Scottish artemisias by applying his method of analysis: the results were probably too low. As to the commercial aspect, the Imperial Institute lately published a report suggesting that it was not commercially profitable to extract santonin from artemisias containing less than about 1.3 per cent. of it. If that was so, the value of the raw material would be about 2d. per lb.; was it worth growing? How much per annum was likely to be obtained from Scottish artemisias?

MR. WALLIS commented on the discovery that the leaves of artemisia contained more santonin than the flower-heads—reversing the former idea. What was the zero time in the graphs?

REPLY

DR. COUTTS, replying, said the zero time was early in May. The chairman's query as to commercial possibilities had been answered by Mr. Corfield. His (the author's) analytical processes received confirmation from the processes of other analysts. He had not had much material available, but apparently the variation in the percentages of santonin in wild and in cultivated plants was similar. No discrepancy arose in the drying process.

The author was thanked by the chairman.

The next two papers, taken together, were on:—

A New Method of Analysis of Some Mercurial Ointments

By WM. R. HEADING

[ABSTRACT]

THIS subject was suggested in the last Conference research list as requiring investigation. The author has surveyed past work in this field with the object of endeavouring to place the analysis of mercurial ointments on a more uniform basis, without any sacrifice of accuracy or speed. Mercurial ointments, he states, may be divided into two types:—(i) Those in which mercury or one of its compounds is distributed unchanged in a fatty or

BRITISH PHARMACEUTICAL CONFERENCE 1934

paraffin basis; and (ii) those, like strong mercuric nitrate ointment, which contain the metal chemically combined with a saponifiable basis. The present paper discusses a new method of analysis of the first type. After an investigation of past work the author finally adopted the following process, which, he states, has given consistently good results:—*Centrifugal Process*—The principle of this method is to dissolve the ointment basis in a suitable organic solvent, and to separate the suspended mercury or its compound by rotating the suspension in the tubes of a centrifuge. The solid deposited is then freed from the clear supernatant solution of the basis, transferred to a flask and determined by one of the standard methods. Xylol was found to be definitely the best solvent, but light petroleum is also quite suitable. Official preparations which may be thus assayed include unguentum hydrargyri, unguentum hydrargyri compositum, unguentum hydrargyri subchloridi, unguentum hydrargyri ammoniati and oculentum hydrargyri oxidi. It is also suitable for many other similar preparations in which the active constituent is insoluble in xylol or light petroleum, while it will be seen that its use is not restricted only to those containing mercury. Details of the method, which up to a certain stage is common to the assays of all the preparations mentioned, are as follows (the term " mercury " includes inorganic mercury compounds):—

Weigh a suitable quantity of the ointment into a dry, round-bottomed centrifuge tube, removing any which is within an inch of the top of the tube. Dissolve the basis, with the aid of gentle heat, in 5 mils of xylol or light petroleum. Solution may be assisted by stirring with a glass rod, which, before being removed, is rinsed down, together with the side of the tube, with a little more solvent. Place the tube in a centrifuge and rotate rapidly until the solution is clear above the mercury at the bottom. Syphon off as much of the liquid as possible without disturbing the deposit. Shake the tube. Add 8 mils of light petroleum and repeat the centrifuging and removal of the liquid twice more. Next add 5 mils of alcohol (90 per cent.) and centrifuge finally until no mercury is suspended in either of the liquid layers. Syphon off the petroleum layer and some of the alcohol, and treat the residue as follows according to the nature of the ointment under examination. (i) *Ointments Containing Uncombined Oxides of Mercury*.—Draw off the alcohol to within ½ in. of the deposited solid, evaporate off the remainder in a water bath and add sufficient nitric acid to dissolve the metal or oxide with the aid of gentle heat. Transfer the solution to a flask, rinsing out the tube with water, and titrate with $N/20$ ammonium thiocyanate according to the official directions for the assay of yellow mercuric oxide. (ii) *Unguentum Hydrargyri Ammoniatum*.—Warm and shake the tube to diffuse the deposit into the alcohol, and pour the mixture into a small flask. Rinse out the tube into the flask completely with several small portions of warm alcohol or acetone, and finally with a little water. If any solid adheres persistently to the side of the tube, 3 mils of 10-per-cent. potassium iodide solution may be substituted for the water. Add 3 gm. of potassium iodide to the liquid in the flask and complete the assay according to the official process for ammoniated mercury. From 1 to 2 gm. of ointment should be weighed out originally. (iii) *Unguentum Hydrargyri Subchloridi*.—Transfer the deposited mercurous chloride to a flask in the same way as in the case of ammoniated mercury, but without the use of potassium iodide. Complete the assay according to the official directions for subchloride of mercury, though it is not necessary to add more than 30 mils of $N/10$ iodine solution. From 0.75 to 1.5 gm. of ointment should be used for the assay.

The author then gives a few notes on the method, following these by experimental results. The table shows results obtained in determinations by the foregoing method.

Ointment	Purity of Active Ingredient	Results of Assays: Centrifugal Method	Mean	B.P. Method	Mean	Actual strength of Ointment (assuming ingredient to have been 100 per cent. pure)	Percentage Error
		Percentage of Hg					
Ung. hydrarg.	99·97	30·12 30·08 30·10	30·10	30·02 29·96 30·07	30·02	30·1	0·11
Ung. hydrarg. co. Sample I	99·97	11·97 11·94 11·96	11·96	11·96 11·84 11·94	11·91	12·0	0·31
Ung. hydrarg. co. Sample II	unknown	11·70 11·68 11·67	11·69	11·59 11·63	11·61	unknown	
		Percentage of HgO					
Ung. hydrarg. oxid. flav. ...	98·13	9·80 9·82 9·79	9·80			10·0	0·13
Oculent. hydrarg. oxid.	98·13	0·94 0·98	0·96			1·0	2·13
		Percentage of $HgNH_2Cl$					
Ung. hydrarg. ammon. Sample I	98·42	4·86 4·90	4·88			5·0	
Ung. hydrarg. ammon. Sample II ...	unknown	4·87 4·84 4·88	4·86			unknown	
		Percentage of HgCl					
Ung. hydrarg. subchlor.	99·97	19·81 19·88 19·91	19·87			20·0	0·62

Summary

The method recommended for the assay of mercury or one of its compounds in ointments, when it is distributed through, but not chemically combined with, the basis, consists of dissolving the basis in xylol in a centrifuge tube, and centrifugally separating out the suspended solid. Most of the liquid is now syphoned off, and the process repeated twice with fresh portions of solvent, replacing the xylol after the first time with light petroleum. A layer of alcohol is now interposed between the deposited solid and the petroleum layer. The mixture is centrifuged again, and the petroleum layer, along with some of the alcohol, drawn off. Either the residual alcohol is now evaporated off, the solid dissolved in nitric acid, transferred to a flask and titrated with ammonium thiocyanate, or the mixture is shaken, the alcoholic suspension rinsed out into a flask, and the assay of the salt completed by the official or any suitable process. The method is suitable for any ointment in which the active constituent (i) has a specific gravity higher than that of light petroleum, (ii) is not soluble in neutral organic solvents, (iii) is not chemically combined with the ointment bases, (iv) is capable of being accurately assayed in the pure state. From the School of Pharmacy, University College, Nottingham.

An Improved Method for the Assay of Strong Ointment of Mercuric Nitrate

By Wm. R. Heading

[Abstract]

With the advent of the 1932 Pharmacopœia, an assay process for strong ointment of mercuric nitrate was introduced. This ointment belongs to the type in which the metal or its compound is not merely diffused unchanged through the ointment basis, but is partially combined with it. After a survey of past work the author describes the following new method which is based on a combination of two processes employed in the determination of mercury by Crewe and François:—

Weigh from 1 to 2 gm. of ointment into a 200 mil beaker made of heat-resisting glass. Add about the same weight of zinc dust and 20 mils of 50 per cent. aqueous potassium hydroxide. Boil gently, stirring frequently with a glass rod, for twenty-five minutes, adding portions of 5 mils of water occasionally to keep down frothing and to replace evaporated liquid. After twenty-five minutes, add water to make up to about 50 mils, and 3 mils of solution of formaldehyde, continuing now to boil briskly until the soap solution is a clear

BRITISH PHARMACEUTICAL CONFERENCE 1934

or translucent brown colour about the zinc amalgam. Rinse down the sides of the beaker with distilled water and decant off the soap solution through a small circle of filter paper in a Gooch crucible on a pressure flask. The liquid collects in the flask, which is attached to a suction pump. Wash the amalgam in the beaker with water and pour the washings through the crucible. Add 5 mils of water to the beaker and pour nitric acid, drop by drop, through the crucible, held over the beaker, till no traces of solid remain on the filter. Dissolve the remainder of the amalgam in more nitric acid with the aid of gentle heat. Cool, add dilute potassium permanganate solution till a pink colour persists, and decolourise with a drop or two of ferrous sulphate solution. Now add solution of ferric alum, dilute to about 60 mils with water, and titrate with $N/10$ ammonium thiocyanate to a permanent reddish tint. Each millilitre of $N/10$ ammonium thiocyanate is equivalent to 0.01003 gm. of mercury. Notes on the process are also given.

Under "experimental results," the author states that numerous samples of strong ointment of mercuric nitrate were examined, these being chosen from old and newly made ointments, of which the colour varied from lemon-yellow to dark brown. Since there is no definite official figure for the percentage of mercury in the ointment, the results could only be compared with those obtained by the pharmacopœial assay. The fresh ointments were made according to the official directions, and in no case contained less than 6.7 per cent. of metal. The mercury used was taken as 100 per cent. pure, within the limits of experimental error. In addition, as a test on the accuracy of the process in different hands, several assays were performed by students. Results so obtained are marked with an asterisk in the following table.

ASSAY RESULTS

(Expressed as percentages of Hg)

Sample	Nature of Ointment	New Method		B.P. Method	
		Results	Means	Results	Means
I	Old sample dark brown ...	7·45 7·41 7·49	7·45	7·29 6·85	7·13
II	Old sample dark brown ...	6·80 6·88	6·84	6·80	
III	New sample pale yellow ...	7·43 7·47	7·45	7·42	
		7·42* 7·63*	7·52*		
IV	New sample brown ...	6·94 7·00 6·92*	6·95	6·95 6·90	6·93

The results will be seen to accord well with those of the official method, and it was found that the rate of saponification of the ointment was not influenced by the age or colour of the ointment, the latter being taken as an approximate index of the temperature at which the preparation was made (and of the degree of conversion of olein into elaidin (?)). Two official mercurial ointments which have not yet been mentioned are then discussed. The analysis of dilute ointment of mercuric nitrate, states the author, is best performed in the same way as the official assay of oleated mercury. Considerable work was done in endeavouring to place the analysis of oleated mercury on the same lines as the saponification process described. While some fairly good results were obtained, these were hardly consistent enough to justify the method being extended to include this compound. There appears to be no better method for the assay of oleated mercury than the present official one, but in the case of strong ointment of mercuric nitrate, the new process offers definite advantages over the one given in the Pharmacopœia.

SUMMARY

The proposed new method for the analysis of strong ointment of mercuric nitrate consists of heating the ointment with 50 per cent. aqueous potassium hydroxide for about thirty-five minutes in the presence of zinc dust. The mercury is set free first as mercuric oxide, which is now reduced to metal by the hydrogen generated from the action of the alkali on the zinc. An amalgam is formed with the excess of zinc and the mercury is thus obtained quantitatively in a granular form, which may be easily freed from soap by decantation, filtration and washing. The amalgam is next dissolved in nitric acid, and the mercury determined by means of ammonium thiocyanate, the presence of zinc as nitrate being quite without effect. Compared with the official assay of this ointment, the new method, without loss of accuracy, affords considerable advantages in convenience and speed. From the School of Pharmacy, University College, Nottingham.

DISCUSSION

THE CHAIRMAN congratulated Mr. Heading on the usefulness of his papers.

MR. POWELL also congratulated Mr. Heading, particularly in reference to the second paper.

MR. EVERS said there seemed to be a danger of organically combined mercury going into solution in the xylol. The subject of the second paper presented many difficulties. Mr. Heading's method, however, overcame these difficulties.

MR. BRINDLE said it was his experience that mercury, on boiling, volatilised quickly. He asked if Mr. Heading had tried using a reflux condenser in order to get a higher result.

MR. CORFIELD said he had no doubt that mercury ointments had suffered as a result of being dealt with in groups. In his experience all these ointments were of considerable importance, and it was well worth while to consider them individually.

MR. HEADING replied to the points raised.

The next two papers taken were:—

Senna Stalk: Its Anatomy and Detection in Powdered Senna

By A. HIFNY SABER

[ABSTRACT]

SENNA of commerce always contains a proportion of "stalk," a term which includes any of the slender supporting structures known as rachis, petiole or stem. These stalks are present owing to the difficulty of removing them completely during the preparation of the leaves for the market. Since, however, they contain a large proportion of woody matter and have only a small medicinal value, it is necessary to prescribe a limit for the amount present in the drug defined for pharmacopœial use. The British Pharmacopœia, 1932, presents a limit of "1 per cent. of stalks" and the U.S.P. X has a limit of "10 per cent. of its stems." Although it is a simple matter to determine the amount of "stalk" or "stem" present in samples of the unground drug, there is no method at present available for either the identification or the determination of stalk in the powdered drug.

The author discusses in detail epidermis, cortex, pericycle, vascular bundles, xylem, medullary rays, pith, and starch grains, and compares the arrangement of the vascular strands in petiole and rachis, with drawings.

SUMMARY AND CONCLUSIONS

A. Powdered senna stalk is characterised by the presence of:—

1. Few warty unicellular, thick-walled trichomes similar to those of the leaf.

2. Pieces of epidermis, with few stomata; the cells being subrectangular prisms with straight anticlinal walls. Occasional epidermal particles of the pulvinus, brownish in colour, and consisting of smaller polygonal cells with beaded walls.

3. Pieces of groups of pericyclic fibres usually accompanied by crystal cells; the lumina of the fibres are generally lined by a substance which is coloured slightly pink with ruthanium red, and dissolves by digestion in a water bath with 5-per-cent. aqueous solution of caustic potash.

BRITISH PHARMACEUTICAL CONFERENCE 1934

4. Cluster crystals of calcium oxalate; size varies from 14 to 31 microns in diameter. Those from the pith are usually larger than those from either the cortex or the phloem.

5. Thin-walled, lignified, simple-pitted cells of the pith. Occasionally, cells contain cluster crystals of calcium oxalate enclosed in slightly lignified membranes.

6. Starch grains free or in cells. They are simple or compound with 2 to 5 or rarely 6 components; the simple grains being spheroidal or lenticular, and 3.5 to 17 microns usually from 8 to 10 microns in diameter, the hilum being centric or slightly eccentric, irregularly circular or elongated.

7. Few stone cells with moderately thickened lignified walls and sometimes containing prisms of calcium oxalate. They are usually seen attached to the pericyclic fibres.

8. Fibrous cells from the xylem of the stem, containing numerous small starch grains.

B. The "stalks" may be detected in powdered senna by the presence of:—

1. Simple starch grains having a diameter greater than 6.5 microns and also compound starch grains. The starch grains in the leaf are very rare, generally simple and do not exceed 6.5 microns in diameter.

2. Very few lignified sclerenchymatous cells of the pericycle, especially when the stem is present.

3. The lignified, thin-walled cells of the pith; these are totally absent from the leaf.

4. Occasional cluster crystals of calcium oxalate enclosed in slightly lignified membrane.

The author expresses his indebtedness to Mr. T. E. Wallis for supervising this work, which was done in the Pharmacognosy Research Laboratory of the Pharmaceutical Society.

The Determination of Senna Stalk in Senna

By A. Hifny Saber

[Abstract]

It has been shown that the epidermal area per gm. of leaf furnishes an excellent criterion for determining with accuracy the amount of leaf in the form of powder even when present in such a small proportion as 2 per cent. The author has further shown that the method devised for such quantitative microscopical work possesses a very high degree of accuracy, and that any error that may arise in analysing a commercial powder is mainly due to the natural variation in the datum based on the epidermal area. Such variation produces, in extreme cases, an error of not more than 15 per cent. With a view to extending the utilisation of this datum for determining other organs, senna stalk was chosen as a typical example. The stalks are a common adulterant in all leaves occurring as drugs.

It was necessary to make the determinations on powdered stalks by means of the microscopical method, because there is no accurate method available for determining the superficial area per gm. of the unground materials. The stalk was first dried at 100° C. to facilitate the powdering of the hard tissues, especially the pericycle, and was then reduced to No. 85 powder in an iron hand-mortar. The powder was then dried at 100° C. and kept in a desiccator for use. In making the preparation for the microscopical examination it was found necessary slightly to modify the general procedure as follows:—

About 0.1 gm. of the No. 85 powder is mixed with about 0.05 gm. of lycopodium, both weighed accurately, and the mixture made into a fine paste and then transferred to a small specimen glass tube by the addition of 5 mils of 5-per-cent. solution of caustic potash. The tube is supported in boiling water for ten to fifteen minutes and occasionally shaken; it is then cooled and 6 or 7 mils of alcohol (50 per cent.) is added; the tube is corked, centrifugated and the clear supernatant liquid is decanted. The residue left in the tube is washed with more of the alcohol two or three times or till it is free from the alkali as indicated by litmus paper. Then after decanting the alcohol as completely as possible 1 mil of chloral hydrate solution (5 in 2) is added and the preparation made up to about 10 mils with the suspending fluid, viz., glycerin-tragacanth mixture.

In determining epidermal area of stalk in admixture with powdered senna leaf one is immediately faced with the difficulty that part of the leaf epidermis is indistinguishable from that of the stalk. This part consists of the epidermis over the veins on the underside of the leaf and a small amount near the margins. It is therefore necessary to make preliminary experiments to find the amount of such epidermis naturally present in the leaf. (Details are given.) The "Dutch process" as modified by Goldberg was applied to determine the amount of "stalks" in the mixture (used for the previous microscopical work) of senna leaf and stalks in No. 60 powder. The filtering material used was a finely woven cotton cloth, "standard tarantulle," having 92 threads per linear inch.

Summary and Conclusions

1. The epidermal area per gm. of senna "stalks" is an excellent criterion for determining the amount of these organs in the form of powder.

2. This datum can be used successfully in determining the amount of "stalks" in powdered leaves.

3. For the determination of the percentage of "stalks" in senna leaves this new microscopical method is far more reliable in its accuracy than the "crude fibre" method.

4. Since the area of the epidermis per gm. of the "stalks" is comparatively small, it is very difficult and tedious to determine amounts of less than 5 per cent. of the "stalks" in senna leaves.

5. In view of these findings it would seem desirable to raise the limit of "stalks" allowed by the British Pharmacopœia in senna leaves from 1 per cent. to 5 per cent.

The author wishes to express his indebtedness to Mr. T. E. Wallis, who has personally supervised this research, done in the Pharmacognosy Research Laboratory of the Pharmaceutical Society.

Discussion

The Chairman congratulated the author on his papers, and especially for his improvement on the crude fibre method. He doubted the wisdom of suggesting the raising of the B.P. limit from 1 per cent. to 5 per cent. He noticed that the statement that stalks have less activity than leaves was not backed up by references to literature.

Mr. Berry was also doubtful as to the percentage limit for stalks. He congratulated the author.

Mr. Wallis remarked that the author had done much painstaking work in the preparation of his papers. The anatomy of the stalks had to be studied very thoroughly in order to get a criterion. Perhaps wholesalers could say what percentage of stalk was usually found in the drug as imported.

Mr. Dewar called attention to the excellence of the work involved in the paper, and particularly of the drawings.

Mr. Brindle doubted whether it was wise for the Pharmacopœia to lay down standards of this kind.

Mr. Nelson asked whether the number of stomata was taken into account, or whether this character was lost in powdering.

Mr. Berry remarked that cascara bark, though woody, had activity.

Mr. Saber, in reply, said that he could not express a view on the physiological activity of woody tissue. There were fewer stomata on stalks, but this character was variable. On the lower side of the leaf there were fewer stomata than on other parts.

The author was thanked by the chairman.

BRITISH PHARMACEUTICAL CONFERENCE 1934

The last paper was on:—

The Discovery of Chloroform as a General Anæsthetic

By J. P. Gilmour

[Abstract]

As early as 1833, an impure chloroform called chloric ether, which was really a spirituous solution of chloroform began to be used as an internal medicinal agent by Dr. Black of Bolton, who proved its efficacy in asthma and adynamic conditions of the system. In 1838, Dr. Formby of Liverpool, to whom chloric ether had been made known by Mr. David Waldie of the Apothecaries' Hall there, found it of special value as an antispasmodic. In 1842, Dr. Mortimer Glover, a young Edinburgh graduate, discovered by experiment that chloric ether was a powerful narcotic poison to animals, one of its effects being to induce in them anæsthesia or insensibility. J. Lyle Davidson, a pharmacist, cites the testimony of his father that he, when a student under Glover at Newcastle-on-Tyne, was for demonstration purposes put under chloroform by his teacher. In March 1847, the celebrated French physiologist, Flourens, demonstrated that the inhalation of chloroform caused in animals precisely the kind of anæsthesia induced by the inhalation of ether. In the summer of the same year, Sir William Lawrence and Mr. Holmes Coote began to administer chloric ether as a general anæsthetic at St. Bartholomew's Hospital, London. A side-line research made by Sir Robert Christison elicited the interesting fact of the part played by pharmacy in this historic event. The two eminent surgeons above named were made acquainted with the anæsthetic properties of chloric ether, by a Mr. Furnell, a former student in the Pharmaceutical Society's School, and afterwards a surgeon in the Indian Medical Service.

Simpson's "Discovery"

It was on November 4, 1847, in his private residence at 52 Queen Street, Edinburgh, that what is commonly accepted as the original canonical version of the "accidental" discovery of the anæsthetic properties of chloroform so dramatically took place. This momentous event is thus described by Simpson in a letter to Waldie. (The italics are the author's.) "I am sure you will be delighted to see part of the good results of our *hasty* conversation. I had the chloroform for several days in the house before trying it, as after seeing it such a heavy non-volatile liquid, I *despaired of it* and went on dreaming about others. The first night we took it, Dr. Duncan, Dr. Keith and I all tried it simultaneously and were all under the table in a trice." Another version is given by Simpson in a letter to Dr. Glover. "On the first occasion on which I *detected* the anæsthetic effects of chloroform the scene was an odd one. I had the chloroform beside me for several days, but it seemed so unlikely a liquid to produce results of any kind that it was laid aside, and on searching for another object among some loose papers after coming home late one night, I chanced to fall upon it, and I poured some of the fluid into tumblers before my assistants Dr. Keith, Dr. Duncan and myself. Before sitting down to supper we all inhaled the fluid and were all under the mahogany in a trice, to my wife's consternation." Simpson's naive narrative is decisively discredited by the following passage in the biography of Sir Robert Christison, by his sons. "One day, when he (Dr. Matthews Duncan of the 'Noctes Chloroformi') was in Dr. Gregory's laboratory at the college, he got possession of every liquid in the laboratory which he imagined would 'breathe.' Four or five bottles were carried off, and chloroform was one. At that time the correspondence with Dr. Waldie about anæsthetics, and the suggestion by that gentleman to try chloroform had not been heard of by Dr. Duncan. He had previously experimented upon himself with various substances but found none suitable. On trying chloroform, he was convinced that the article sought for had been found. The same or the next evening the trial was repeated by Dr. Keith, Sir J. Y. Simpson and himself. This is the trial which is matter of history, but the previous trial has never been noticed."

Sources of the Supplies of Chloroform

In 1847, despite the growing hospital use of chloric ether, pure chloroform was still little more than a chemical curiosity. It is certain that Waldie manufactured the chloric ether prescribed by Dr. Formby and other Liverpool physicians, but on his own testimony, although in what Simpson casually alludes to as a "hasty conversation," Waldie mentioned chloroform to Simpson as a possible anæsthetic, it was not he who supplied the sample used on November 4, 1847, since this had been brought by Dr. Duncan from Professor Greogry's laboratory. It is recorded that Simpson frequently drove out from Edinburgh to watch the progress of Waldie's researches. On one occasion he placed some chloroform in a saucer on the off-chance that a roving mouse might be attracted and give a demonstration of the physiological action of this enigmatical compound. Instead, Waldie's favourite dog, "Fido," sniffed at the saucer, straightway fell down insensible, and was only resuscitated with difficulty. It is surely unaccountable that in the pamphlet recounting the circumstances of his "discovery" Simpson should have been silent as to this remarkable incident. From whom, then, did he obtain his early supplies of chloroform? Here is his own testimony. "I have had during the summer and autumn (of 1847) ethereal tinctures, etc., of several potent drugs manufactured for me for experiment by Messrs. Duncan Flockhart & Co. of this city, the excellent chemists and druggists of this city (Edinburgh). I have tried upon myself and others the inhalation of other volatile fluids. I have found, however, one infinitely more efficacious, namely, chloroform or the perchloride of formyle, and I am enabled to speak most confidently of its superior anæsthetic properties, having tried it upon upwards of thirty individuals. The liquid I have used has been manufactured for me by Mr. Hunter of the laboratory of Duncan Flockhart & Co." There was, however, another source of supply the record of which only came to light in 1879. Mr. E. Northway Butt, a man of mark in the affairs of the Pharmaceutical Society, relates that when an apprentice with Mr. George Simpson, a pharmacist of Kennington, afterwards a partner in the historic firm of Simpson, Maule & Nicholson, one of the pioneer British manufacturers of aniline dyes, he turned out a batch of chloroform by the following process:—

154 lb. of Chlorinated lime.
63¼ pints of Wood naphtha.

These ingredients were mixed with water q.s., distilled in a steam-heated still, the distillate mixed with strong sulphuric acid and redistilled with carbonate of baryta and dried calcium chloride. The purified product weighed 13 lb. 2 oz. and was supplied to Dr. Simpson of Edinburgh in November 1847. Mr. Butt claimed that this was the first chloroform prepared as a commercial article in Great Britain, but the honours must, in fairness, be divided with Waldie who had previously devised an improved process, and Duncan & Flockhart. It is noteworthy that a subsidiary fiscal factor that contributed to the ascendency in the drug market of chloroform manufactured in Edinburgh was its exemption from the differential import duty of 4s. 2d. per gallon imposed by the English Customs on all spirituous mixtures passing from Scotland into England.

Waldie's Contribution

The inscription on the mural memorial to Waldie at Linlithgow bears that he was "A Pioneer in Anæsthetic Research. To him belongs the distinction of having been the first to recommend and make practicable the use of chloroform in the alleviation of human suffering." In the pamphlet setting forth the case for his title to an essential service facilitating Simpson's introduction of chloroform as an anæsthetic, Waldie says: "On the

BRITISH PHARMACEUTICAL CONFERENCE 1934

occasion of a visit to Dr. Simpson when in Scotland, in 1847, he spoke to me of his trials of various vapours in his endeavours to discover something else than ether, amongst others mentioning chloric ether, the chemical constitution of which he was evidently unaware. This I explained to him, showing him that it was chiefly vapour of alcohol." The only acknowledgment made by Simpson for such material aid was in a footnote in his pamphlet descriptive of his "discovery" of chloroform as an anæsthetic.

The Verdict

All human judgments are open to revision. The plain facts of the case as herein set out amount to a legal as well as moral proof that when Simpson "despaired" of chloroform as an anæsthetic, and "chanced to fall upon" the specimen of it among some loose papers in his house, and poured it out into tumblers blindly to inhale what in his narrative was by implication an utterly unknown chemical he actually knew much more about it than is avowed in his subsequently published statements which were calculated to give the impression that he alone "detected" the anæsthetic action of chloroform. It must reluctantly be concluded that in the whole affair Simpson showed up in an unfavourable light, especially in his scurvy treatment of Waldie, and by his indefensible silence as to the lead given to him by Dr. Matthew Duncan's preliminary experiment on himself. What is to his everlasting credit and forms the greenest and most shining leaf in the crown of bays on the image of his memory is the intrepid and triumphant battle that he waged for the official adoption and establishment of chloroform as a general anæsthetic.

I gratefully express my indebtedness to Mr. J. Rutherford Hill, Resident Secretary of the Pharmaceutical Society in Scotland, a living treasury of pharmaceutical lore for that country, and Mr. J. J. Blackie of Messrs. Duncan Flockhart & Co., Edinburgh, for first-hand information as to the intimate part taken by that firm in the early manufacture of chloroform.

Discussion

Mr. Berry inquired whether a Midland doctor had made a prior claim.

Mr. Lescher congratulated the author on his historical research. It was surely almost unique that a Scotsman should criticise a Scotsman. (Laughter.) The Pharmaceutical Society's School must in those early days have encouraged adventure—witness the experiments of John Bell & Co.'s assistant. (Laughter.)

Mr. Gilmour, in reply, mentioned H. H. Hickman as the Midland doctor probably referred to. He, however, had not used chloroform but carbon dioxide and deoxygenated air. Scotsmen did not readily criticise each other among Englishmen, but did among themselves. (Laughter.)

The Chairman thanked Mr. Gilmour for his very interesting paper and declared the session closed.

Science Section

Wednesday Morning

A gathering of more than average size met at Leeds University on Wednesday morning, in spite of the rival attraction of the delegates' meeting held simultaneously.

The first paper was:—

The Mechanism of the Anticoagulant Action of Azodyes in Blood Clotting

By A. St. G. Huggett

[Abstract]

This paper describes the experiments performed to localise the seat of the anticoagulant action of azo-dyes, which property of delaying blood clotting is possessed particularly by diazo direct dyes prepared from tetrazotised diamines coupled with aminonaphthol sulphonic acids. The most active dyes are chlorazol sky blue FFS, chlorazol blue 3B (trypan blue), congo red, and chlorazol fast pink BKS (which last is especially efficient and non-toxic). The method of investigation is based upon the theory of blood clotting enunciated by Morawitz, as modified by Mellanby. The essential change is the conversion of the fibrinogen present in plasma into fibrin, the change from globulin to insoluble gel being brought about by the enzyme thrombase. Thrombase is not normally present, though its precursor (prothrombase) occurs in plasma. The change from prothrombase to thrombase is caused by the activating principle of injured tissues (thrombokinase) in the presence of ionised calcium. The two globulins prothrombase and fibrinogen are intimately associated. When prothrombase is converted into thrombase, the latter immediately converts fibrinogen into fibrin. The following points were established:—

A. *The clotting time varies as the amount of dye.* The coagulation of plasma by thrombokinase is inhibited by the azo-dye, and the delay varies with the amount of dye.

B. *Prolongation of clotting times is not due to change in* pH *value.* Two solutions of fibrinogen-prothrombase complex were coagulated by adding calcium chloride and thrombokinase, the dye delaying clotting time to two hours, compared with two minutes for control at the same hydrogen-ion concentration.

C. *Azo-dye inhibits the action of thrombase.* The addition of dye to fibrinogen solution markedly delays the coagulating action of thrombase solution as shown by comparison with dye-free controls.

D. *The dye does not destroy fibrinogen.* Fibrinogen solution admixed with dye and incubated at 38° C. for varying periods before adding thrombase solution did not show any progressive prolongation of clotting time.

E. *The dye does not destroy thrombase.* The incubation of thrombase-dye mixture of varying periods before adding to fibrinogen solution did not change the prolongation in coagulation time.

F. *Dyes inhibit the action of thrombokinase.* Comparative tests with strong and weak solutions of thrombase show that the conversion of prothrombase into thrombase is inhibited by azo-dye.

G. *Azo-dye does not destroy thrombokinase.*

H. *Azo-dye does not destroy the calcium ion.*

It is clear from the above that the anti-coagulant action of azo-dyes is due to an inhibition of active enzymes. The azo-dyes do not destroy nor remove any of the active components of the blood clotting system, but they do inhibit the actions of thrombokinase (converting prothrombase to thrombase) and thrombase (changing fibrinogen to fibrin).

The author makes acknowledgment to Professor F. M. Rowe, Dr. Sylvia Dickinson, Dr. F. L. Pyman, F.R.S., (Boots Pure Drug Co., Ltd.), and Imperial Chemical Industries, Ltd. (Dyestuffs Group).

Summary

The azo-dyes chlorazol sky blue FFS (chicago blue 6B) and chlorazol fast pink BKS act as anticoagulants by inhibiting the action of the enzymes thrombokinase and thrombase in converting prothrombase in the plasma to thrombase and the fibrinogen of the plasma to fibrin.

This paper was illustrated by lantern slides.

Discussion

The Chairman said they wished to thank Dr. Huggett for his paper. He expressed pleasure that the author had chosen the medium of the Conference to publish these important results.

Professor Burn congratulated Dr. Huggett on a valuable piece of work. How far the subject had a clinical significance was a matter for speculation. So far as the pharmacological laboratory was concerned, the paper was of very great value. In the pharmacological laboratory some expensive anti-coagulant had to be used, but since Dr. Huggett's experiments that position was

BRITISH PHARMACEUTICAL CONFERENCE 1934

changed. This was a point which made large numbers of experiments possible.

MR. BRINDLE said it was supposed that magnesium was antagonistic to calcium in pharmacological action. He asked if this was the case in the blood.

DR. HUGGETT, in reply, said the dyes had at present no clinical significance. They were, however, related to substances of great chemical importance. There was no doubt that the dyes had two separate actions, first on kinase, and secondly by inhibiting thrombase. Magnesium has been known for many years to be anticoagulant ; large doses were required, the drug appearing to act as a precipitant. There was no evidence to show it antagonised the calcium ion.

The next paper taken was:—

The Composition and Stability of Donovan's Solution

By C. MORTON and F. R. C. BATESON

[ABSTRACT]

THE view that a true double iodide of arsenic and mercury exists in aqueous solution is untenable, and recent suggestions are that Donovan's solution contains the compound HgI_2, HI or HgI_2, 2HI. The difficulty of investigating the composition of the compound in solution was eventually overcome by cryoscopic measurements. Representing the reaction occurring in the pharmacopœial solution by the general equation

$$x\mathrm{HI}+y\mathrm{HgI_2}=x\mathrm{HI},\ y\mathrm{HgI_2}$$

the addition of one mol of mercuric iodide to a solution containing excess of arsenious (or hydrogen) iodide diminishes the total number of mols in solution by $x/y-1$. It is shown that

$$x/y= \quad /c\mathrm{K}+1$$

where is the elevation of freezing point obtained on the addition of c mols of mercuric iodide to 100 gm. of arsenious acid solution and K is the molecular depression of the solvent. Values of x/y computed from determinations of the freezing-point elevations produced by successive addition of mercuric iodide to a 1 per cent. w/v solution of arsenious iodide are given in Table I.

Solution	1	2	3	4
AsI_3 per cent. w/v	1·0000	1·0000	1·0000	1·0000
HgI_2 per cent. w/v... ...	0·4986	0·8274	0·9804	1·3706
c = mols of HgI_2 per 100 gm. of solvent	0·001107	0·001837	0·002176	0·003042
CCΔ	0·046	0·060	0·062	0·066
$\frac{x}{y}=\frac{\Delta}{c\mathrm{K}}+1$	3·24	2·76	2·53	2·17

It will be seen that the ratio x/y is not constant, but for a given solution of arsenious iodide diminishes regularly with increasing concentration of mercuric iodide, indicating that the solutions in general contain more than one complex electrolyte. The lower limiting value appears to be $x/y=2$, a value which is approached in solutions which are approximately saturated with mercuric iodide ; in such solutions the chief electrolyte is HgI_2, 2HI. As the proportion of mercuric iodide in the solution decreases, this compound is gradually transformed into a second complex electrolyte containing a relatively higher proportion of hydrogen iodide. The value of the ratio for Donovan's solution (containing 1 per cent. w/v of mercuric iodide) is found by interpolation from the data of the Table to be $x/y=2.5$ approximately, corresponding with the formula HgI_2, 2.5 HI.

This conclusion is confirmed by conductimetric and potentiometric investigations. Conductimetric titration of solutions (0.01 *N*) of arsenious iodide, potassium iodide, and neutralised arsenious iodide with mercuric chloride solution (0.1*M*) show an inflexion in all three curves, corresponding to the formation of HgI_2, 2.5HI or HgI_2, 2.5KI.

At this point the solution is on the point of precipitating mercuric iodide. Further addition of mercuric chloride causes an immediate precipitate and a second inflexion marks the end of this secondary reaction. Electrometric titration gives (with saturated iodine electrode against saturated calomel electrode) a curve of potentials showing a very slight inflexion corresponding with the formation of HgI_2, 2.5KI and a protracted inflexion marking the complete precipitation of iodide ion as mercuric iodide.

It is concluded that the solute in the pharmacopœial solution has the approximate composition HgI_2, 2.5HI, and consists of a mixture of the compound HgI_2, 2HI with a second complex electrolyte containing a higher proportion of hydrogen iodide. The authors find that, under normal storage conditions, oxidation of tervalent arsenic in Donovan's solution takes place to the extent of about 7 per cent. in three months, and that this is incomplete after three years. They suggest that almost perfect stability would be ensured by making the solution neutral to litmus, and that the use of impure arsenious iodide may account for the discrepancy between the above result and the pharmacopœial statement that the solution is rapidly oxidised.

SUMMARY

Determinations of the elevation of the freezing point, produced by adding successive increments of mercuric iodide to aqueous solutions of arsenious iodide, lead to the conclusion that such solutions contain in general more than one complex electrolyte. The solute in the pharmacopœial solution has the approximate composition HgI_2, 2.5HI, and consists of a mixture of the compound HgI_2, 2HI with a second complex electrolyte containing a higher proportion of hydrogen iodide. Similar conclusions are arrived at from the results of conductimetric and potentiometric titrations. Under normal conditions of storage, oxidation of the tervalent arsenic in Donovan's solution takes place to the extent of only about 7 per cent. in three months, and is incomplete after three years.

COMMENT

There was no response to the chairman's invitation to discuss this paper, but THE CHAIRMAN, in thanking the authors, said that although it might be that Donovan's solution was going out of use, it was of interest to ascertain its stability. The question arose whether arsenious iodide which behaved in an unsatisfactory way was below the B.P. standard of purity.

The next paper taken was:—

The Assay of Phenazone (Antipyrin)

By HARRY BRINDLE

[ABSTRACT]

THE method of Bougoult for the assay of antipyrin consists in adding 1 gm. of potassium bicarbonate to 10 mils of antipyrin in a stoppered flask, followed by 10 mils of decinormal solution of iodine, the mixture being allowed to stand for one hour with occasional shaking. The mixture is then acidified with 1 mil of glacial acetic acid, the precipitate dissolved by shaking with 10 mils of chloroform, and the excess of iodine titrated with decinormal solution of sodium thiosulphate. The method gives results which are too high, assays showing 100.44 to 100.63 per cent. The amount of antipyrin is too small to be satisfactory, a difference of 0.02 mil in burette reading introducing a difference of 0.2 per cent. in the result.

Kolthoff shortened the process by using sodium acetate in place of sodium bicarbonate and emitting acetic acid. The mixture is allowed to stand for twenty minutes and the iodopyrin precipitate is dissolved in 20-25 mils of alcohol. The results are invariably high, ranging from 100.44 to 100.91 per cent. Greater consistency was obtained by doubling the weight of antipyrin used for assay and modifying the process by dissolving the precipitate in chloroform instead of alcohol. Assay by Bougoult's procedure, omitting antipyrin, showed a loss

BRITISH PHARMACEUTICAL CONFERENCE 1934

of iodine equivalent to 0.08 mil of $N/10$ iodine, probably due to iodine being carried off as vapour during evolution of carbon dioxide. The method of Bougoult was not investigated further, as Kolthoff's method, suitably modified, possesses many advantages. The reagents of the Kolthoff process react with iodine to slight extent, giving figures which are 0.5 to 1.0 per cent. too high. The iodopyrin precipitate does not readily dissolve in alcohol, and it is difficult to understand the use of alcohol in preference to chloroform. The amount of antipyrin is too small for accurate assay, and increase necessitates a larger volume of alcohol, whereas 10 mils of chloroform still suffices. The following improved method is suggested:—

Weigh about 0.2 gm. of the sample, dissolve in 20 mils of water in a stoppered flask, add 2 gm. of pure sodium acetate, dissolve and add 30 mils of $N/10$ iodine. Shake at intervals for twenty minutes. Add 10 mils of chloroform and shake until the precipitate is dissolved ; titrate the excess of iodine with $N/10$ sodium thiosulphate. Determine the amount of $N/10$ iodine used by the reagents by repeating the process, omitting the antipyrin (or preferably omitting the antipyrin and using 10 mils of $N/10$ iodine only, since this gives approximately the same concentration of iodine as occurs during the actual determination). Deduct the volume of $N/10$ iodine used by the reagents from the amount apparently combining with the antipyrin ; 1 mil of $N/10$ iodine is equivalent to 0.009405 gm. of antipyrin.

Assays by the above process are given in the following table:—

Weight of antipyrin used	Per cent. found without allowance for a blank	Mils of $N/10$ iodine used up by reagents	Per cent. found with allowance for blank
0·2105	99·84	0·05	99·54
0·1882	99·75	0·05	99·45
0·2332	99·88	0·05	99·58

Average of three determinations 99·52 per cent.

A similar result was obtained as an average of a number of determinations, using the original Bougoult and Kolthoff methods with the introduction of blank determinations, but in these cases the variation was considerably greater and the blank correction higher. The accuracy of the method was further checked by recrystallising the sample of antipyrin twice from water and drying in a vacuum desiccator over sulphuric acid until there was no further loss of weight. This sample of purified phenazonum assayed by the improved method as follows:—

Weight of purified antipyrin used	Equivalent per cent. without "blank" allowance	Per cent. with allowance for blank
0·1949	100·10	99·85
0·2015	100·08	99·83

Summary

Bougoult's method for the assay of antipyrin and Kolthoff's modification are shown to give results which, according to the purity of the reagents used, are from 0.3 to 1.0 per cent. too high, unless blank determinations are carried out.

Fairly accurate results are obtainable by introducing a correction for the amount of iodine used up by the reagents, but the following process offers advantages over both methods in convenience and accuracy:—

0.2 gm. of the antipyrin and 2 gm. of sodium acetate are dissolved in 20 mils of water in a stoppered flask and 30 mils of $N/10$ iodine solution added. The flask and contents are allowed to stand with occasional shaking for twenty minutes. The precipitate is then dissolved by adding 10 mils of chloroform and shaking and the excess of iodine titrated with $N/10$ sodium thiosulphate solution. The amount of iodine reacting with the reagents is determined by repeating the process, omitting the antipyrin or preferably by using only 10 mils of $N/10$ iodine for the blank determination. An allowance is made for the iodine which reacts with reagents.

Discussion

The Chairman, in inviting discussion, said the Conference was indebted to Mr. Brindle for a very useful paper.

Mr. Page cited the use of chloroform in the assay process of another worker.

Mr. Corfield suggested that there was very little difficulty in satisfying oneself as to the purity of a single organic substance, and that the Pharmacopœia need hardly lay down assay processes for such. Was the author's method applicable to compound tablets containing phenazone and to salts of it—e.g. phenazone salicylate?

Mr. Brindle, in reply, agreed with Mr. Corfield that one can usually be satisfied as to the purity of single organic substances, but added that as an analyst he liked to be certain; hence the devising of this process. The method worked with some mixed substances tried by him.

The next paper was on:—

The Assay of Strong Solution of Lead Subacetate

By S. Wetherell

[Abstract]

An examination was carried out on the B.P. method of assay for total lead and alkalinity.

Total Lead.—The possibilities of error in the determination of total lead in strong solution of lead subacetate arise from incomplete precipitation of lead oxalate, adsorption of oxalic acid, and incomplete decomposition of lead oxalate by sulphuric acid. The error from loss of lead in oxalate precipitation was negligible, being less than 0.0007 gm. of lead per 100 mils of filtrate and washings. Tests indicated that there was a definite adsorption of oxalic acid by the lead oxalate precipitate, but this appears to be removed during washing of the precipitate. A series of experiments showed that when lead oxalate is decomposed by sulphuric acid (prior to titration of oxalic acid with $N/10$ permanganate solution) there is occlusion of lead oxalate in the precipitate of lead sulphate, and that this occluded oxalate does not react with the permanganate solution. Comparative tests were made with the U.S.P. X. process (in which excess of oxalic acid is determined after lead has been precipitated from a known amount of $N/10$ oxalic acid solution). The results, in terms of total lead in strong solution of lead subacetate, were as follows:—

Table I

	U.S.P. method	Modified B.P. method
1	20·73 per cent.	20·50 per cent.
2	20·73 per cent.	20·54 per cent.
3	20·75 per cent.	20·51 per cent.

The B.P. method of assay gives lower results than the U.S.P. process owing to the occlusion of lead oxalate in the precipitate of lead sulphate. Table II gives the total lead in lead subacetate solution, as determined gravimetrically by three different methods in comparison with the B.P. assay process:—

Table II

	(*a*) Sulphate method		(*b*) Chromate method	B.P. method
	Drying at 110° C.	Ignition	Drying at 110° C.	
	Per cent.	Per cent.	Per cent.	Per cent.
1	20·85	20·77	20·88	20·49
2	20·84	20·80	20·86	20·53
3		20·81	20·92	20·56
4			20·86	20·52

BRITISH PHARMACEUTICAL CONFERENCE 1934

It is concluded that the consistently low results of the B.P. method are due to occlusion of lead oxalate, the average amount of error being over 1.5 per cent. Concordant results are obtained by the U.S.P. assay, these being only slightly lower (about 0.5 per cent.) than those found gravimetrically. Adsorption of oxalic acid, if present, would produce high figures, so this factor is negligible. It can be reasonably assumed that the small error is due to the interfering action of oxidisable impurities in the acetic acid liberated from the lead subacetate. These have an action on the permanganate in solution, but the end-point is easily detected owing to the slowness of the decolorisation by the impurities.

Determination of Alkalinity.—The factors affecting the accuracy of the B.P. method were investigated. It is important that the solubility of the precipitate of lead sulphate should be low, as during titration of excess acid with standard alkali the latter would react with the dissolved lead sulphate. An experiment showed that the presence of lead sulphate in the decanted liquid would lead to erroneous results. However, the solubility of lead sulphate in water is reduced by the presence of sulphuric acid. Colorimetric assay showed an average of 10 parts of lead per million parts of supernatant liquid. An attempt was made to estimate the amount of sulphuric acid adsorbed by the lead sulphate precipitate. This effect, if it took place, was more than counterbalanced by some other factor. A detailed investigation was made of the volume occupied by the lead precipitate. The method depended upon the excess of acid being approximately halved by dilution and decantation (carried out in a special apparatus avoiding disturbance of the precipitate). Table III contains the experimental results:—

TABLE III

	Dilution in mils	Weigbt of lead solution in gm.	Amount of N/1 sulphuric acid used, in mils	Calculated volume of the precipitate	Alkalinity in per cent. of PbO	Percentage corrected for volume of precipitate
1 ...	200	20·4353	50	—	11·45	11·51
2 ...	200	18·8282	50	—	11·43	11·48
3 ...	200	20·5927	50	—	11·42	11·48
4 ...	200	19·9955	100	1·27	11·43	11·48
5 ...	200	20·8757	100	1·06	11·38	11·43
6 ...	200	32·4669	100	1·64	11·42	11·48
7 ...	200	19·5379	100	1·13	11·43	11·48

The average (calculated) volume of precipitate (equivalent to 6.10 gm. of lead sulphate) was 1.11 mil per 20 gm. of lead subacetate solution. The volume of the precipitate (approximately 1 mil.) introduces an error of about 0.5 per cent. into the alkalinity determination.

Determination of Acetic Acid.—The acetic radicle was assayed by the volumetric benzidine method. This depends upon precipitating lead by sulphuric acid in the presence of alcohol, removing the excess of sulphuric acid by precipitation as benzidine sulphate, and determining by titration with alkali the acetic acid remaining in solution. The use of a Gooch crucible for filtration under reduced pressure halved the time taken without detracting from the accuracy of the method. The results were concordant and in close agreement with those obtained by distillation. The percentage of lead calculated from the acetic acid content of the lead subacetate solution ranged from 10.18 to 10.22 per cent. Table IV gives the results of the various determinations. The percentage of lead from acetic acid subtracted from the total lead as determined gravimetrically, gives a figure of 10.64, agreeing closely with the corrected value for lead from alkalinity. It thus appears that the total lead exists in a definite ratio of acidic and basic lead.

TABLE IV

		Average per cent.
1	Total lead as determined by gravimetric methods ...	= 20·84
2	Lead as determined by acetic acid content	= 10·20
	Difference	= 10·64
3	Alkalinity as determined by the B.P. metbod with correction for the volume of the precipitate applied (expressed as Pb)	= 10·65

Summary

(1) Results approximately 1.75 per cent. too low are given by the B.P. method of determining total lead in strong solution of lead subacetate, owing to occlusion of lead oxalate during lead sulphate precipitation.

(2) The U.S.P. process for determining total lead is only 0.5 per cent. in error.

(3) The B.P. assay for alkalinity is affected by the volume of the precipitated lead sulphate. This causes the results to be approximately 0.5 per cent. low.

Discussion

THE CHAIRMAN said the author had studied his subject very thoroughly.

MR. BRINDLE remarked that Mr. Wetherell's first Conference paper was carefully and accurately done.

MR. EVERS added his congratulations. The author did not seem to mention the formula for lead subacetate which he took for calculating the lead.

MR. CORFIELD asked if an advance was gained by a pharmacopœial assay process for lead monoxide.

MR. WETHERELL, in reply, said it was unnecessary to know the formula for lead subacetate to calculate lead in the form of subacetate. He was trying to get a process for all lead compounds.

The next paper taken was:—

The Analytical Classification of Fish-Liver Oils

By NORMAN EVERS and WILFRED SMITH

[ABSTRACT]

THE present paper consists of Parts IV and V of the investigation and consists of further observations on the spectrographic method of examination and further analytical results of various fish-liver oils. The coefficient of extinction now adopted is independent of the specific gravity of the solvent, the value $E^{1\ cm.}_{1\ per\ cent.}$ referring to the extinction coefficient at a wave-length of 328 mμ of a 1-per-cent. solution in a thickness of 1 cm. Cyclohexane is now preferred to chloroform for solvent purposes, and the previous figures (Part III) should be divided by 1.49 (the specific gravity of chloroform) to be comparable with the new data. The $E^{1\ cm.}_{1\ per\ cent.}$ values of the unsaponifiable matter of oils of low vitamin content is almost invariably lower than those found for the oils themselves. The difference is not due to losses in preparing the unsaponifiable matter, but to elimination of absorbing substances other than vitamin A. It is suggested that the determination of the coefficient of extinction should be carried out on the unsaponifiable matter of oils with a blue value of less than 100, and on the oil itself when the blue value exceeds 100. With oils of the higher vitamin content the absorption of other constituents is small compared with that due to vitamin A. Extraction of unsaponifiable matter by the Smith and Hazley method using chloroform results in very large loss owing to destruction of vitamin A during evaporation of the chloroform solution to dryness prior to resaponification. The method published by the Society of Public Analysts is rather long, bnt undoubtedly the most accurate, and it seemed that using cyclohexane as solvent for extraction would save time and diminish the possibility of loss. The following

BRITISH PHARMACEUTICAL CONFERENCE 1934

method was found to give results comparable with those given by the S.P.A. method:—

Weigh out the quantity of oil necessary to give the desired concentration for examination in the spectrograph when dissolved in 50 mils of solvent. Add 0.5 mil of 10*N* aqueous potassium hydroxide and 5 mils of alcohol (95 per cent.). Heat in a boiling water bath under a reflux condenser for fifteen minutes. Wash into a small separator with 5 mils of water and extract by shaking thoroughly with successive quantities of 20, 10, 10 and 5 mils of cyclohexane (spectrographically pure). To the mixed cyclohexane extracts add 10 mils of water, swirl round gently, and allow to stand for five minutes without shaking. Run off the water and wash the cyclohexane by shaking with two successive quantities of 10 mils of water. Filter the cyclohexane solution into a 50-mil flask, and wash the separator and filter paper with cyclohexane until the total volume is 50 mils.

Table I gives comparative results. W, Y and Z are medicinal oils of recent date. T is a medicinal oil twenty-two years old, U being a cattle oil and V a very crude "coast cod" oil.

TABLE I

Oil	$E^{1\text{ cm.}}_{1\text{ per cent.}}$ on oil	Method for unsap. matter	Per cent. unsap. matter	$E^{1\text{ cm.}}_{1\text{ per cent.}}$ on unsap. matter
Z	0·80	S.P.A.	1·24	0·67
Z	0·80	Cyclohexane	1·00	0·64
				0·60
				0·58
Y	0·53	S.P.A.	0·88	0·44
		Cyclohexane	1·10	0·44
T	0·73	S.P.A.	1·03	0 43
U	1·18	Cyclohexane	—	1·00
V	0·53	Cyclohexane	—	0·40
W	0·53	Cyclohexane	—	0·45
		S.P.A.	0·91	0·50

The reduction in the value of $E^{1\text{ cm.}}_{1\text{ per cent.}}$ is very definite in all cases except perhaps in oil W. The largest reduction occurs in oil T, which was twenty-two years old. This oil had been kept in an amber corked bottle in the dark during this period, and was in quite good condition as regards odour and taste. It contained only minute traces of peroxides, showing absence of oxidation. The blue value of the oil when first opened in 1929 was 8.2; this had dropped in March 1934 to 2.8, but the blue value of the unsaponifiable matter determined by Smith and Hazley's method was 11.3. A biological test kindly carried out by Mrs. Lathbury, of The British Drug Houses, showed that vitamin A was present in much greater amount than was indicated by a blue value of 2.8. The ultra-violet absorption curves of this oil and of its unsaponifiable matter show that the curve of the oil itself shows no maximum at 328mμ, but that that of the unsaponifiable matter has the normal form of a vitamin A-containing oil. The peak at 328mμ is completely obscured by products which have been formed during the long storage of the oil.

The cyclohexane method is applicable to shark-liver oil, as it extracts the whole of the vitamin, though the whole of the unsaponifiable matter is not extracted.

Table II contains a number of analytical results obtained during the year on oils of special interest. The iodine values of the oils (except where otherwise stated) were determined by the method of Wijs as given in the B.P. The iodine values of the unsaponifiable matter were obtained by the Rosenmund-Kuhnhenn method, which gives results for sterols nearer to the theoretical values, but lower than the Wijs values.

The halibut-liver oils again show wide variations in vitamin-A content. The refractive index and the unsaponifiable matter rise rapidly in the case of oils of high vitamin content. A matter which appears to require further investigation is the iodine values of the unsaponifiable matter. The theoretical iodine value according to the supposed formula of vitamin A is 356. In the case of oils A and G the actual percentage of vitamin A is 9.0 and 8.0 per cent. respectively, amounting to 42 and 40 per cent. of the unsaponifiable matter. The iodine values of 145 and 149 therefore can be accounted for almost entirely by the vitamin A present. Since the remainder of the unsaponifiable matter certainly contains cholesterol, which has an iodine value of 66, there is obviously a discrepancy here which requires explanation.

SUMMARY

(1) Cyclohexane is a better solvent than chloroform for the spectrographic examination of fish-liver oils for vitamin A.

(2) The determination should be made on the unsaponifiable matter of oils of low vitamin-A content.

(3) A short method of extracting the unsaponifiable matter using cyclohexane as the solvent is described.

(4) Further analytical results on fish-liver oils are reported.

The authors express their thanks to Allen & Hanburys, Ltd., for permission to publish these results.

DISCUSSION

THE CHAIRMAN pointed out that the use of cyclohexane by the authors was novel. Did all the vitamin A pass into the unsaponifiable matter?

MR. POWELL remarked that the use of chloroform raised interesting points, and wished to know more about oil "T" in one of the author's tables.

DR. BURN inquired whether oil "T" would have given quite different results if analysed in 1912 (it being twenty-two years old): was the process of extraction then substantially the same as now?

MR. GRIER asked whether blue value was now accepted

TABLE II

Oil		Species	S. g. 15·5°/15·5° C.	Ref. Ind. 40° C.	Acid Value	Sap. Value	Iodine Value	Unsap. matter		Blue Value	Vitamin A $E^{1\text{ cm.}}_{1\text{ per cent.}}$
								Per cent.	Iodine Value		
Halibut liver	A	*Hippoglossus hippoglossus*	0·9285	1·4865	—	153	141	21·5	145	7,100	144
	B	*Hippoglossus hippoglossus*	0·9263	1·4810	0·4	160	142	16·0		4,400	91
	C	*Hippoglossus hippoglossus*	0·9275	1·4754	—	169	124	12·4		2,080	43
	D	*Hippoglossus hippoglossus*	0·9235	1·4728	0·1	176	135	10·0		1,020	20·7
	E	*Hippoglossus hippoglossus*	0·9282	1·4735	0·2	174	140	10·0		1,000	21·9
	F	*Hippoglossus hippoglossus*	—	—	—	—	125*	10·4	115	920	19·2
	G	*Hippoglossus hippoglossus*	0·9220	1·4880	—	150	190†	20·0	149	5,500	128
	H	*Hippoglossus hippoglossus*	0·9252	1·4742	0·45	172	134	11·1		2,100	48
Turbot liver	A	*Rhombus maximu*	0·9221	1·4691	5·9	177	121	7·20		120	2·56
	B	*Rhombus maximus*	0·9238	1·4708	0·22	178	127	6·25		430	11·2
	C	*Rhombus maximus*	0·9244	1·4700	0·30	178	114	7·46		800	18·6
	D	*Rhombus maximus*	0·9252	1·4681	0·56	—	126	7·0		730	
Salmon liver	A	*Salmo salar*	0·9261	1·4725	0·22	176	150	6·48		800	14·6
	B	*Salmo salar*	0·9280	1·4747	—	175	136	7·98		500	11·5
Monk-fish liver		*Lophis piscatorius*	0·9304	1·4733	0·30	185	167	2·6		7·6	0·63

* Value by Rosenmund-Kuhnhenn method 115.

† Value by Rosenmund-Kuhnhenn method 175.

BRITISH PHARMACEUTICAL CONFERENCE 1934

as an index of vitamin A, or whether it represented vitamins A and D.

REPLY

MR. EVERS, in reply, said various facts tended to show that all the vitamin A passed into the unsaponifiable matter. The cruder the oil, the more difference there was between results obtained on the oil and those obtained on the unsaponifiable matter. The 1912 oil ("T") was obtained by substantially the same method as that of the present day. Blue value was probably not entirely the equivalent of vitamin A, but it was certainly not vitamin D.

The next paper was on:—

The Preparation of a Dry Extract of Ipecacuanha with some Notes on Ipecacuanha Root of Commerce

By ARTHUR W. LUPTON

[ABSTRACT]

Part I.—The Preparation of Extractum Ipecacuanhae Siccum

FOR many years it has been the practice to include in the pages of official and unofficial formularies several galenicals of a particular drug, each having its own method of preparation, thereby involving an equivalent number of processes and, in the cases of the more potent drugs, a number of assays. The more recent pharmacopœias have inclined towards the preparation of one or two standardised galenicals from which the remainder might be made by suitable dilution, or, in some cases, incorporation with other desirable ingredients. The British Pharmacopœia of 1932 has carried this aim still further in many instances, but not in all, and it has been the object of the present work to still further advance this attempt at uniformity. The drug Cephaëlis Ipecacuanha was chosen because (*a*) there are many secondary galenicals which might be prepared from a standard primary galenical; (*b*) these secondary galenicals must be of a definite strength; (*c*) it has not been possible, so far, to make a satisfactory dry extract of ipecacuanha as a primary galenical from which its secondary galenicals can be prepared. The material used was (*a*) samples of ordinary pulvis ipecacuanhae of commerce; and (*b*) specially sorted, decorticated and ground radix ipecacuanhae.

(1) *Reserve-percolation with 90 per cent. alcohol.*—A strong percolate was prepared by this method using as menstruum alcohol (90 per cent.), evaporated to dryness *in vacuo* at a temperature of 60° C. and powdered. The dry extract obtained by the above process is described by the author. The normal method of manufacture of a dry extract of ipecacuanha, the author states, is therefore unsuitable on account of (*a*) the insolubility of the product; (*b*) the somewhat large amount of inert extractive, not being colouring matter, resulting in a tinctorially weak secondary galenical.

(2) *Reserve-percolation with acid alcohol.*—The properties of extracts obtained by using an acidulated percolate were examined using the same samples of root. A trial menstruum containing 3 per cent. of hydrogen chloride in alcohol (90 per cent.) was used, and the same method for the preparation of the extract carried out. This extract was entirely different in appearance from the previous one (the author then describes the extract). Steps were then taken to ascertain if any alteration in the percentage of alkaloid was produced by the removal of the black insoluble matter by filtration. The extract gained slightly in strength, indicating that its removal was not disadvantageous. A similar extract was then made. It was dissolved in alcohol (90 per cent.), the insoluble matter removed by filtration and the filtrate evaporated and re-dried *in vacuo*. This new extract, as might be expected, was completely soluble in alcohol (90 per cent.). It would appear that as the original percolate was perfectly bright, some change in the inert matter takes place during the concentration, resulting in the production of an insoluble portion. No further change took place in the method of purification above. The amount of insoluble matter removed in this step was about 8 per cent. of the unpurified extract taken.

(3) *Preparation of galenicals.*—Since one of the functions of a primary galenical is the preparation of secondary galenicals, this was tested by preparing the liquid extract and the tincture from dry extract obtained by extraction with acid alcohol. (*a*) *Liquid Extract of Ipecacuanha.*—Simple solution of the dry extract in alcohol (1 per cent.) gave a liquid which was of the colour and strength of the liquid extract of the Pharmacopœia. (*b*) *Tincture of Ipecacuanha.*—

	B.P. 1932	Equivalent
Liquid extract of ipecacuanha B.P. ...	50·0 mils	—
Dry extract of ipecacuanha	—	13·025 gm
Glycerin	200·0 mils	200·0 mils
Alcohol (90 per cent.)	200·0 mils	200·0 mils
Distilled water to	1000·0 mils	1000·0 mils

The alcohol and glycerin were mixed and the dry extract incorporated with the mixture. No clotting or other difficulty was experienced, the solution readily becoming deep brown with the fine, black precipitate remaining in the case of the unpurified extract. Water was added to volume, the product set aside for 24 hours and filtered. The filtrate corresponded in colour with the tincture of the Pharmacopœia. On assay it was found to contain 0.1008 per cent. w/v of total alkaloids, a figure which lies within the official limits; the very small discrepancy of 0.0008 per cent. being easily accounted for as experimental error.

4. *Effect of variation in acidity of menstruum.*—Six new dry extracts were now prepared with a view to ascertaining what differences, if any, were evidenced by using less acid, it being decided that 3 per cent. HCl forms a maximum practical strength on account of fumes during preparation. The menstrua used are given in Table I.

TABLE I

	HCl 32 per cent. S.G. 1·16	Absolute alcohol	Distilled water to	Final product alcohol (90 per cent.) containing HCl
a ...	181·8 mils	—	200 mils	—
b ...	181·8 mils	2·7 mils	200 mils	0·5 per cent.
c ...	181·8 mils	5·4 mils	200 mils	1·0 per cent.
d ...	181·8 mils	8·1 mils	200 mils	1·5 per cent.
e ...	181·8 mils	10·8 mils	200 mils	2·0 per cent.
f ...	181·8 mils	13·5 mils	200 mils	2·5 per cent.

The primary percolates varied in colour, ranging from pale-sherry in the case of (*a*), to a deep brown in the case of (*f*). Each extract was dried *in vacuo* at

TABLE II

Colour	Solubility in Alcohol (90 per cent.)	Solubility in water	Solubility in alcohol-glycerine-water*	Yield	Assay Total
a Cocoa-brown.	Almost soluble on long standing. Very light solution. Brown residue.	Light brown solution. Not completely soluble.	Not completely soluble. Light brown solution. Feathery ppt.	14·5	8·28
b Black-brown.	Dark solution. Slight black ppt.	Yellow tint to solution. Practically insoluble.	Faint yellow solution. Practically insoluble.	20·8	9·78
c Black...	Darker solution than b	Very faint colour to solution. Pract. insoluble.	Ditto ...	21·5	9·18
d Black...	Darker solution than c.	Ditto ...	Ditto ...	19·6	9·6
e Black...	Darker than d.	Ditto ...	Ditto ...	19·9	9·48
f Black...	Almost black solution.	Ditto ...	Ditto ...	19·2	9·48

* When dissolved in the alcohol first, a solution was readily obtained which was not affected by the addition of the aqueous glycerin.

BRITISH PHARMACEUTICAL CONFERENCE 1934

45° C. Table II gives the characteristics of each of the extracts obtained.

The extracts (*b*) and (*f*) were compared separately as to colour of similar solutions, and although (*f*) gave a much darker solution, (*b*) gave a colour comparable with that of tincture of ipecacuanha, B.P.

Conclusion and Summary

A dry extract of ipecacuanha can be made which is permanent when stored under normal conditions. It has a strength and has properties which make it suitable for conversion into acetum, pastillus, trochiscus, tinctura, extractum liquidum, elixir, suppositorium, glycerinum, pilula and other preparations; in some cases being preferable to the liquid extract or powder, as at present used. A suggested method of preparation is the reserve percolation process, with a menstruum of 0.5 per cent. of hydrogen chloride in alcohol (90 per cent.), to exhaustion, evaporation under reduced pressure, and final drying *in vacuo* at a temperature of 45° to 55° C.

Part II.—Notes on Ipecacuanha Root of Commerce

Ipecacuanha pulverata, B.P.—Difficulty has been experienced by the author in obtaining a sample of ipecacuanha root which approaches the B.P. figure of 2 per cent. of total alkaloids calculated as emetine, although as much as 2.7 per cent. has been reported. The relationship between phenolic and non-phenolic alkaloids has been preserved although the total alkaloids present have not exceeded 1.7 per cent., being usually in the region of 1.3 per cent. to 1.5 per cent. It has been stated that most of the alkaloids reside in the cortical portion. This was investigated and a sample of ipecacuanha of commerce was taken from a new bale and examined. The true root was sorted from doubtful root and aerial portion and gave the following yield:—True root (not all thickened), 71 per cent.; doubtful root, aerial portion, etc., 29 per cent. The true root was then decorticated and gave:—Cortical portion, 80 per cent.; central stele, 20 per cent. The cortical portion was reduced to fine powder and assayed by the official method for ipecacuanha pulverata, giving:—Total alkaloids, 2.118 per cent.; non-phenolic alkaloids, 1.600 per cent. The stele in fine powder, similarly assayed, gave:—Total alkaloids, 0.768 per cent.; non-phenolic alkaloids, 0.318 per cent. It would appear that, in order to make ipecacuanha pulverata B.P. from commercial samples of the root, up to 40 per cent. of the sample must be rejected, although an ipecacuanha of 1.5 per cent. of total alkaloids could readily be obtained. The yield of dry extract from the cortical portion was 22.9 per cent., with a total alkaloid content of 9.2 per cent. It would appear, therefore, that any advantage derived from the use of cortex only as a source of dry extract is nullified by the higher yield of total extract (total solids) obtained. The inert extractive yield is greater in the case of cortex than in the case of stele.

Summary

The low non-phenolic alkaloid content of the stele, together with the low yield of total alkaloids, makes the removal of it necessary in the preparation of ipecacuanha pulverata, B.P., but the low inert extractive yield indicates that the stele should not be removed when the powder is to be used for preparing a dry extract. In the above work $N/10$ sulphuric acid was used for the solution of the residue in the final stage of the assay at a temperature of about 60° to 70° C., it being found that complete solution was not effected at room temperature. In some cases, a difference of 10 per cent. in the degree of extraction was observed. In the back-titration using methyl-red, $N/40$ sodium hydroxide was found to give a more accurate reading than the $N/10$ solution specified in the Pharmacopœia. From the Department of Physiology, School of Medicine, University of Leeds.

Discussion

The Chairman said Mr. Lupton raised several interesting points. The principle of preparing a solid extract of a drug for dilution seemed to offer considerable possibilities. The question of the keeping properties for a longer period than a few weeks would have to be investigated. Dr. Hampshire asked if it was a general experience that root containing 2 per cent. of alkaloids was difficult to obtain.

Mr. Bird said all would remember the acetic extracts of older pharmacopœias, which involved the same principle but gave considerable trouble. Mr. Lupton seemed to have overcome all the difficulties with a workable process. Mr. Bird was struck by the amount of alkaloid in the central stele.

Mr. Berry thought there was no disadvantage in administering the powdered drug; it was suitable for tablets, and for fluid preparations there was no reason why the liquid should not be the starting point.

Mr. Deane said the work seemed to have been done in glass; this was not possible on a manufacturing scale. There was a lot of root on the market below 2 per cent., but there was no real difficulty in obtaining root of B.P. standard.

Mr. Corfield said he was interested in the process in connection with the notes on ipecacuanha root of commerce. Mr. Corfield quoted results on thirty-seven samples of ipecacuanha tested in his laboratory since 1932. The results, he said, were a complete justification of B.P. requirements, and showed there was ipecacuanha on the market complying with the B.P. standard. The B.P. required not more than 5 per cent. stem; some of the ipecacuanha of commerce contained 25-30 per cent. of something like stem. There was no need to reject that substance.

Mr. Wallis said it would have been better if Mr. Lupton had given separate figures for stem and root. The amount of alkaloid in the stem might vary according to season.

Mr. Corran said he had found total alkaloids up to 3 per cent.

Mr. Deane referred to samples containing stem up to 25-30 per cent. These stems contained about three-quarters of the alkaloids present in the root.

Mr. Page inquired if the final extract was acid.

Mr. Wallis wondered if the acid combined with the alkaloid or any other substance.

Mr. Lupton briefly replied on the points raised.

The last two papers taken at this session were:—

A Note on the Preparation of Pure Acriflavine

By Joseph Marshall

[Abstract]

The separation of diaminoacridine from acriflavine by simple means is based upon treatment of a 10-per-cent. solution of impure acriflavine with excess of caustic soda solution. This precipitates part of the diaminoacridine as a reddish coloured oil which solidifies on standing. Partial separation is also effected by adding concentrated hydrochloric acid to a 10-per-cent. aqueous solution of acriflavine, the maximum precipitation of crystalline material occurring when 14 mils of acid is added to 50 mils of solution. A small excess of acid suffices to throw down the diaminoacridine hydrochloride, but considerable acid is required to reprecipitate acriflavine.

Four batches of acriflavine were subjected to the following process combining treatment with alkali and acid:—28 gm. of acriflavine was dissolved in 280 mils of water and poured with stirring into 400 mils of cold 10*N* caustic soda. After standing the clear supernatant liquid was poured off and the solid drained on the pump. The precipitate was transferred to a beaker and stirred with 50 mils of cold water to remove as much excess alkali as possible. It was then extracted with three successive quantities of 100 mils of cold water and finally with 100 mils of hot water. The solid residue was filtered, well drained and weighed (moist). The aqueous extract was treated with two volumes of hydrochloric acid, the solid residue being dissolved in 150 mils of water with the addition of a little hydrochloric acid and the diaminoacridine hydrochloride precipitated by

BRITISH PHARMACEUTICAL CONFERENCE 1934

the addition of 20 mils concentrated hydrochloric acid. The solution was allowed to stand overnight before filtering and the precipitate well drained and dried in a steam-oven overnight. The following table shows the amounts of material recovered from each sample together with a roughly calculated percentage of diaminoacridine dihydrochloride in the original sample (the percentages are approximate only, owing to diaminoacridine dihydrochloride losing hydrochloric acid on drying under the above conditions):—

Batch No.	Moist diaminoacridine	Dry diaminoacridine hydrochloride	Dry acriflavine	Percentage diaminoacridine hydrochloride in origin
B	7	6·5	18	23
C	6	5·5	16	20
D	9	8	13	30
E	4·5	5	15	18

It was found that much less soda is required than in the above experiments. A laboratory batch was made by the original Benda process to ascertain whether there was any difference between small and large scale products. The laboratory material assayed 31 per cent. of diaminoacridine hydrochloride by the method of Powell and Hall. 200 mils of 10-per-cent. solution was treated with 50 mils of 5*N* sodium hydroxide, the dark oil after separation being extracted with 200 mils of water at 35° C. The residue was washed with 50 mils of hot water and the aqueous extract and washings heated with charcoal for a few minutes, filtered and made slightly acid with hydrochloric acid. After evaporation to 150 mils the solution was mixed with 300 mils of hydrochloric acid. The crystals which separated contained 10 per cent. of diaminoacridine hydrochloride, and it was discovered that on recrystallisation from water the diaminoacridine remains in the mother liquid and the acriflavine crystals are practically freed from diaminoacridine. Analysis confirmed that only a "negligible" proportion of this impurity remains.

Properties of Diaminomethylacridinium Chloride

If a warm 15-per-cent. aqueous solution of the salt is cooled down quickly with stirring, apparently yellow crystals begin to separate at about 30° C. from the orange-red solution. After washing with a little water and drying in the air, they consist of small orange coloured platelets. If, instead of cooling the solution rapidly, it is allowed to cool slowly it is possible to obtain large hexagonal prisms. On heating in a steam oven the colour of the crystals changes to a brick red, the substance thus obtained containing one molecule of water of crystallisation which may be removed in an air oven at 120° C. The monohydrate is soluble in 85 parts of water at 20° C.

Properties of Diaminomethylacridinium Chloride Hydrochloride

The hydrochloride of the methochloride may be obtained as shining red needles when a hot 10-per-cent. aqueous solution of the methochloride is mixed with twice its volume of concentrated hydrochloric acid and left to cool slowly.

The hydrolysis of the salt on the addition of water is immediately apparent, as the red crystals change to a yellow colour and under the microscope the presence of the yellow crystals of the methochloride is easily observed. The solubility of the hydrochloride is less than that of the neutral salt and is about 1 in 130. Acriflavine is easily decomposed in alkaline solution. Investigation left no doubt that the substance formed is diaminomethylacridone. The formation of this derivative of acridone is easily explained by assuming that the diaminomethylacridinium hydroxide produced to some extent when alkali is added to acriflavine isomerises to the secondary alcohol, two molecules of which then react to give one molecule of diaminomethylacridone and one molecule of the corresponding acridane. (The latter substance, however, has, up to the present, not been isolated.) The hydrochloride of diaminomethylacridone is stable in excess of hydrochloric acid, but it is hydrolysed by the addition of water yielding crystals of the base.

Summary

From commercial samples of "Acriflavine" containing 30 to 40 per cent. of diaminoacridine, a product containing about 12 per cent. of this material may be obtained by treatment with caustic soda. Recrystallisation of the partly purified product from water then suffices to remove the whole of the remaining diaminoacridine.

The solubility of the methochloride and of its hydrochloride in water have been determined. Alkali quickly converts acriflavine into diaminomethylacridone.

The Analysis of Acriflavine, B.P., and Neutral Acriflavine

By G. F. Hall and A. D. Powell

[Abstract]

The solubility requirements of the British Pharmacopœia are not satisfied unless acriflavine contains an appreciable percentage of diaminoacridine dihydrochloride admixed with the pure substance (hydrochloride of 2: 8-diamino-10-methylacridinium), the proportion of unmethylated compound approaching 30 per cent. The test of purity for limit of proflavine is of no value, as this consists of diaminoacridine sulphate and its presence in acriflavine is unlikely.

The following "Test of Identity" is suggested for inclusion in the B.P. monograph on acriflavine:—

To 5 mils of a 0.4-per-cent. w/v aqueous solution, add a few drops of solution of formaldehyde and 5 mils of a 10-per-cent. aqueous solution of sodium nitrite. Allow to stand for five minutes and filter: the filtrate is red (distinction from euflavine and from diaminoacridine compounds).

Euflavine does not react in its neutral condition, but does so when converted into acriflavine by the addition of hydrochloric acid.

Determination of "Total Flavines."—The presence of nitrogenous decomposition products renders inaccurate the assay of total flavine content based on determination of total nitrogen. Precipitation as ferricyanide provides a truer knowledge of flavine content. Analysis of an impure acriflavine gave the following results:—Acriflavine (from ferricyanide), 71.2 per cent.; acriflavine (from total nitrogen), 78.6 per cent.

Determination of Unmethylated Compounds.—Estimation of methyl radicle by modifications of the Ziesel method are tedious and of doubtful value. A direct method has been developed depending upon treatment of a concentrated solution of acriflavine with alkali. Any diaminoacridine hydrochloride is precipitated as diaminoacridine base, whereas any precipitation of acriflavine occurs as the neutral compound. Hence the amount of alkali neutralised in the precipitation of diaminoacridine base forms a basis for a volumetric determination of this compound. The solution containing mixed flavines is neutralised to bromothymol blue, a measured amount of alkali (in excess) is added, the precipitate filtered off, and the excess of alkali titrated with acid. Experiments showed that low results are produced by factors producing greater solubility (such as dilution and increased temperature). Diaminoacridine base possesses considerable solubility in solutions of neutral acriflavine (particularly when the proportions are two of acriflavine to one of diaminoacridine). Sodium chloride counteracts this solubility error at normal temperature but is less satisfactory than standing and washing at 5° C. owing to precipitate not being readily filtrable. On the other hand, the use of hot alkali reduces co-precipitation of diaminoacridine hydrochloride to a minimum.

Method.—The method finally adopted is as follows:—

0.5 gm. of the sample is dissolved in 20 mils of water (30 mils in the case of neutral acriflavine), and neutralised with *N*/10 sodium hydroxide, using bromothymol blue as indicator. The solution is diluted with water to 35 mils,

BRITISH PHARMACEUTICAL CONFERENCE 1934

warmed to about 60° C., and then exactly 25 mils of *N*/10 sodium hydroxide is added. After the further addition of 20 gm. of pure sodium chloride, the flask is rotated to mix the contents, then allowed to stand overnight, preferably at low temperature (about 5° C.). The precipitate is filtered off (a sintered glass crucible with suction being most convenient for this purpose) and washed with 5 mil quantities of a saturated solution of sodium chloride, previously cooled to about 5° C. The washing is repeated till a 5 mil quantity of wash liquor requires not more than 0.05 mil of *N*/10 sulphuric acid to neutralise to thymol blue (three washings are usually sufficient). To the combined filtrates and washings, 26 mils of *N*/10 sulphuric acid is added, the solution boiled, cooled, and titrated with *N*/10 sodium hydroxide, using bromothymol blue as indicator. Each mil of *N*/10 sodium hydroxide neutralised in the precipitation is equivalent to 0.0282 gm. of diaminoacridine dihydrochloride (or 0.0246 gm. of the monohydrochloride).

The process of Gaillot for analysis of acriflavine (with precipitation as diaminomethylacridinium iodide) is unsatisfactory owing to contamination of the precipitate with potassium iodide.

Table I gives results on samples obtained from different manufacturers.

TABLE I

ACRIFLAVINE

Sample	"Total flavines" (ferricyanide) as acriflavine	Acriflavine from chloride (uncorr.)	Diaminoacridine dihydrochlor. (alkali pptn.)	Proposed qualitative test	
				Direct	After addn. of 1 mil *N*/10HCl
	Per cent.	Per cent.	Per cent.		
A	97·2	96·5	35·2	Red	—
B (1) ...	96·1	96·8	11·0	Red	—
B (2) ...	98·6	96·7	20·0	Red	—
C	93·6	94·6	42·0	Red	—

EUFLAVINE

Sample	"Total flavines" (ferricyanide) as euflavine	Euflavine from chloride correction for NaCl	Diaminoacridine monohydrochlor. (alkali pptn.)	Proposed qualitative test	
				Direct	After addn. of 1 mil of *N*/10 HCl
	Per cent.	Per cent.	Per cent.		
A	91·4	94·2	33·5	Yellow	Red
B (1) ...	93·9	97·2	—	Yellow	Red
B (2) ...	—	—	5·5	—	—
C	87·5	95·6	25·5	Red	—

PROFLAVINE

Sample	"Total flavines" (ferricyanide) as proflavine (sulphate)	Proflavine (sulphate) from sulphate	Proflavine (sulphate) (alkali pptn.)	Proposed qualitative test	
				Direct	After addn. of 1 mil of *N*/10 HCl
	Per cent.	Per cent.	Per cent.		
A	92·4	89·7	92·1	Very slight yellow	Very slight yellow
B	97·7	94·4	—	Yellow	—

Conclusions and Limits Suggested.—The ferricyanide method is recommended for the determination of "total flavine" content and the volumetric method described for estimation of unmethylated compound. A certain proportion of diaminoacridine is an advantage, as pure acriflavine is much less soluble. The following limits appear desirable:—"Total flavines" as acriflavine, not less than 95.0 per cent.; unmethylated compounds as diaminoacridine dihydrochloride, not more than 20.0 per cent.; Cl as acriflavine, not less than 95.0 per cent.; identification by qualitative test proposed, red colour should be given.

SUMMARY

A method is described for the direct determination of diaminoacridine in acriflavine and euflavine (neutral acriflavine). This method, in conjunction with the determination of "total flavines," enables the proportions of methylated and unmethylated compounds to be determined.

A qualitative test for acriflavine is described and limits are proposed for the proportion of diaminoacridine in acriflavine, B.P. This investigation was carried out in the analytical laboratories of Boots Pure Drug Co., Ltd.

The former of these papers was presented in abstract by Dr. Marshall, and the latter by Mr. Powell.

DISCUSSION

THE CHAIRMAN described these papers as very valuable. He had not noticed, however, any recommendations as to the solubility figure, which had been one of the main troubles in connection with this substance.

MR. PAGE inquired whether there was any antiseptic value in diaminoacridine itself.

DR. MARSHALL, replying, said there was no difference between pure and commercial acriflavine in antiseptic action.

MR. POWELL, who also replied, thought it was best to suggest standards for this substance and make the solubility fit them. Further work might be necessary.

This concluded the morning session.

Science Section

Wednesday Afternoon

The venue for the final session of the Science Section was transferred to the School of Medicine. The attendance was above the average.

The first paper, read by Mr. Greer, was on:—

The Preservation of Mucilage of Tragacanth

By H. BURLINSON

[ABSTRACT]

THE British Pharmacopœia, 1932, directs mucilage of tragacanth to be made with chloroform water, this being a 0.25 per cent. solution of chloroform in distilled water. It was decided to ascertain the preserving power of a number of non-volatile chemicals, in relationship to their toxicity, since if they are to be used for this purpose they must have a low toxicity. A series of chemicals was first used, which are the esters of parahydroxybenzoic acid. Salicylic acid is orthohydroxybenzoic acid, but the para derivatives, in the form of esters, have a much more powerful antiseptic action combined with a low toxicity. The propyl derivative is marketed under the name of Nipasol, and the methyl derivative as Nipagen; the ethyl ester was also used. The esters were dissolved in the alcohol used to diffuse the powdered tragacanth before adding the water. One hundred mils of mucilage was made, and stored in white glass-stoppered bottles of 120 mils capacity. These were kept on a shelf at ordinary room temperature, and not exposed to bright sunlight. They were examined daily for the development of fungoid growths by naked eye observation, and also for any development of a foreign odour. The propyl ester was found to have the most powerful preserving power, both as the proprietary Nipasol and the corresponding non-proprietary chemical propyl parahydroxybenzoate. A concentration of 0.03 per cent. in the mucilage kept it fully preserved after standing for fourteen weeks, and the mucilage had developed no foreign odour or taste. Nipagen, and the corresponding chemical methyl parahydroxybenzoate, required to be present in higher concentrations to be effective. It required a concentration of 0.1 per cent. to 0.15 per cent. to keep the mucilage fully preserved. The ethyl ester was ineffective at a concentration of 0.02

BRITISH PHARMACEUTICAL CONFERENCE 1934

per cent., but 0.05 per cent. was quite satisfactory. At concentrations of 0.1 per cent. and 0.2 per cent. the ester tends to crystallise out. Another chemical used for this purpose was hexyl resorcinol, also sold under the name of Caprocol. Mucilages containing 0.25 per cent. and 0.05 per cent. of the chemical were kept quite free from fungoid growth, but on standing, the mucilage containing 0.05 per cent. and above this concentration developed a pale translucent golden yellow colour, the depth of which increased with the concentration of hexylresorcinol. Chlorbutol was next tried, and proved satisfactory in concentrations of 0.3 per cent. to 0.5 per cent. There was, however, a definite camphoraceous odour and taste in the mucilage. Thymol was used in concentrations of 0.15 per cent., 0.2 per cent. and 0.3 per cent. and was found to be quite effective as far as preserving power was concerned; here, again, however, the characteristic odour and taste of the drug were perceptible in the preserved mucilage. As a control, mucilages were made using 1.25 per cent. gum in water with and without the addition of 2.5 per cent. of alcohol. Although after standing, both developed fungoid growths, the preparations containing alcohol developed an extremely sour and fetid odour, which was not nearly so pronounced in mucilages made with gum and water only.

Summary

It is shown that chloroform water is a good preservative for mucilage of tragacanth provided that the mucilage is kept under conditions whereby the chloroform is retained in securely closed containers. The propyl and ethyl esters of parahydroxybenzoic acid are excellent and stable non-volatile preservatives, being active at low concentrations, and ensuring a complete preservation. Propyl parahydroxybenzoate was the most satisfactory of all the preservatives tried, and in a concentration of 0.05 per cent. would appear to be the best available preservative for mucilage of tragacanth.

From the Pharmacy Department, Manchester University.

Discussion

Mr. Bird said the paper served a useful purpose in bringing new preservatives to notice. He had had some experience in the use of parahydroxybenzoic esters in the preservation of an electuary, and a bar to their use, he considered, was a certain physiological action; there was no taste, but there appeared to be an action on the throat.

Mr. Brindle said he had tested some of the mucilage containing the preservatives; there seemed to be very little action on the throat.

Mr. Bordman said in pastes and creams parahydroxybenzoic esters were useful, but not so in liquids.

Mr. Evers said he used parahydroxybenzoic esters for mucilaginous products and found them satisfactory.

Mr. Greer briefly replied.

The next two papers were:—

The Preparation, Viscosity, and Suspending Power of Mucilage of Tragacanth

By H. Brindle and H. Burlinson

[Abstract]

The relative viscosities of the different mucilages were tested by the method used by Evers and MacLachlan. This consists in filling a Nessler cylinder with mucilage up to the 50-mil mark, after dispersion of air bubbles, if present, by spinning in an electric centrifuge. A piece of cardboard 5 in. long and 1½ in. wide, marked at distances of 1⅛ in. and 4 in. from the top, is placed vertically at the side of the cylinder, and a steel ball $\frac{5}{32}$ in. in diameter allowed to fall from the surface of the mucilage. The speed with which the ball falls through the mucilage is proportional to the viscosity. As soon as the lower edge of the ball reaches the upper mark of the scale, a stop-watch is started, and the time taken for the ball to fall between the upper and lower scale marks is noted, and used as a means of comparing the relative viscosities of different preparations. The average of a number of readings was taken. Care must be exercised that the steel ball is placed each time in a different place on the surface of the mucilage. When the ball is placed on exactly the same place as the previous one there is always a much lower reading.

The following table confirms previous results obtained:—

Treatment used	Size of particles	Time in secs.
Whole gum	—	62
Tapped down in a mortar	No. 30 powder	62
Tapped down in a mortar	No. 60 powder	61
Ground to a powder in the mill ...	No. 90 powder	25

Mucilages were prepared, substituting glycerin for alcohol in different proportions, and making by the mortar method. In every case there was a marked lowering of the viscosity as shown thus:—

Treatment used	Time in seconds
B.P. mucilage	17
Substituting 2·5 per cent. glycerin for alcohol in above ...	7
Substituting 5 per cent. glycerin for alcohol in above ...	4
Substituting 7·5 per cent. glycerin for alcohol in above ...	5
Substituting 10 per cent. glycerin for alcohol in above ...	7·5

Mucilages were next made from powdered gum, using a hot mortar, adding about half the volume of boiling water with vigorous trituration until smooth, and then adding the rest of the boiling water in one portion. Using this method a uniform product was obtained almost immediately, and there was no separation into masses of gel which take some time to diffuse. The viscosity was tested as soon as possible after making, when cold, and showed an increase on the same mucilage when made by the official process using cold water. Having observed this increase in viscosity of mucilage of tragacanth, when subjected to heat, it was decided to compare samples made by the official process and that of the U.S.P. X. The latter process consists in bringing a mixture of glycerin and water to boiling point, adding whole gum tragacanth, macerating for twenty-four hours and finally making up to weight. It differs in many respects from the B.P. mucilage. It contains 18 per cent. of glycerin, requires a boiling vehicle and a process of maceration, it uses whole gum and is much stronger than the B.P. mucilage, containing 6 per cent. w/w of gum, whereas the official mucilage contains 1.25 per cent. w/v of gum. The U.S.P. product is a thick jelly which has to be forcibly strained through muslin. Mucilages were made, however, using 1.25 per cent. of whole gum and 4.5 per cent. of glycerin, and following the directions given in the U.S.P. Powdered tragacanth is not suitable for this process. The following table shows a comparison of mucilages made by both processes. Tested after two days.

Viscosity when whole gum was dispersed by shaking in the cold	Viscosity when treated by the U.S.P. X process
62	38
55	44
61	31
61	29
40	22
260	140

These figures show that when freshly prepared, a mucilage made by the U.S.P. process has a lower viscosity than one of the same strength made in the cold. This is probably due to the presence of glycerin. Mucilages prepared by different methods were tested after standing for ten to fourteen weeks, to see whether there had been any alteration in viscosity on keeping. (Tables are given.)

BRITISH PHARMACEUTICAL CONFERENCE 1934

The following table shows the loss in viscosity as a result of fungal attack:—

Viscosity of fresh mucilage	Viscosity after fungal attack
23	18
8	3
30	2
53	3
87	30
171	5
122	24

These figures emphasise the importance of ensuring that mucilages should be properly preserved.

Suspending Power of Diluted Mucilage of Tragacanth

Since mucilages are usually diluted in a mixture when used as suspending agents, it was decided to determine the viscosities of such mucilages when diluted 1 in 8. They were diluted with water so that no particles of original gel remained, but at this concentration the viscosity could not be determined by the falling ball method, since that rate of fall was too rapid for accurate comparison, and therefore a new method was used. Since the value of a mucilage in pharmacy generally lies in its power of keeping an insoluble powder suspended in a liquid medium, then the rate at which that powder falls through the liquid, after being well mixed, will be a measure of the suspending power of the diluted mucilage. The insoluble powder used was calcium carbonate B.P., 160 grains per ten fluid ounces of suspension being used. Care was taken that no particles of undispersed powder or jelly were in the suspension to be tested. This was poured into a wide-necked bottle and allowed to stand overnight to remove excess air which might have been incorporated in the suspension whilst being made, since it would exert a buoyant effect. A small glass crystallising dish, 2½ in. in diameter and 1 in. deep, had three platinum wires fused into the glass at equal distances around the rim of the lip. Threads were attached to the wires and knotted together, so that the whole formed a deep pan which could be suspended from the hook of a balance. A wooden bridge was placed over the metal balance pan, and the jar containing the suspension placed upon it. For remixing the suspension without incorporating air, a disc of copper foil in which holes were bored was attached to the end of a glass rod and moved up and down through the liquid, causing a swirling in the liquid and a thorough mixing of the powder. The glass dish was suspended from the hook of the balance, and its weight when immersed in the suspension determined, as a result of a number of experiments. Since the same strength of suspension was used for every determination, the tare of the dish was constant. When the dish was balanced at zero in the suspension, a 20 mgm. weight was added to the weight pan, and as the particles of powder fell they settled on the bottom of the dish, and exerted their weight due to gravity. The better the diluted mucilage as a suspending agent, the slower the fall of powder and the longer the time taken for 20 mgm. of powder to settle in the dish. A stop-watch was started when the 20 mgm. weight was added, and the time taken for the pointer to return to the zero mark was noted, a further 20 mgm. was added, and a number of readings taken in this manner. (Tables are given.)

Results

(1) A more viscous mucilage is made by substituting whole gum for the fine powder.

(2) When boiling water is used in the preparation, the viscosity is temporarily raised, but on keeping the value becomes lower than that of a corresponding mucilage made in the cold.

(3) Glycerin, when present in concentrations of 7.5 per cent. and 10 per cent., renders the preparation of a homogeneous mucilage more rapid, but is accompanied by a marked lowering in viscosity when tested by the falling ball method.

(4) Mucilages made in the cold tend to increase to a value beyond their initial viscosity as a result of storage.

(5) Mucilages when heated for one hour in a boiling water bath have temporarily an increased viscosity, which, on standing, falls to a value below that of a corresponding mucilage made in the cold.

(6) Attack of the mucilages by fungoid growth is in every case accompanied by a partial liquefaction and great loss in viscosity.

(7) There does not appear to be any relationship between the viscosity of the whole mucilage when tested by the falling ball method and the suspending power of the diluted mucilage.

(8) Mucilages prepared from whole gum show no advantage over those prepared from powdered gum when diluted and tested for suspending power.

(9) On testing the suspensions after storage there is a marked loss in suspending power, no matter how good the suspending power when freshly made. This may be due to hydrolysis of the gum into constituents which have no suspending power.

(10) An exception to this is a suspension made from mucilage containing 7.5 per cent. of glycerin. Although the initial value of the fresh suspension was not very high, it retained its suspending power on storage to a greater extent than those made with gum and water only.

Conclusions

Mucilage of tragacanth made from whole gum has a much higher viscosity than that made from powdered gum, and, if not heated, increases considerably in viscosity on keeping. There does not appear to be any advantage in the adoption of any particular method of preparation when the mucilage is to be diluted and used for its power of retaining an insoluble powder in suspension. Mucilage made with 7.5 per cent. of glycerin when diluted retains its suspending power on keeping to a greater extent than mucilage made by any other method. (From the Pharmaceutical Department, Manchester University.)

The Viscosity of Tragacanth Mucilages

By L. A. Haddock

[Abstract]

It seems desirable to be able to measure the strengths of the mucilages in terms of some absolute unit. An obvious solution is to measure the absolute viscosity of the mucilage in poises at a fixed temperature, e.g., by means of the grot tube viscometer described in the British Pharmacopœia. The measurement of viscosity in this manner implies, however, that the solution being examined shall be entirely homogeneous in nature. This is not true of tragacanth mucilages, and indeed their high viscosity depends on the fact that the individual particles retain in the mucilage some of their original structure. Continued heating will break down this structure, and the mucilage will more nearly approach a homogeneous solution. At the same time, however, the viscosity becomes progressively smaller as the solution becomes more homogeneous, and in the limit a perfectly homogeneous solution will possess little if any mucilaginous property. The measurement of viscosity in absolute units has therefore to be undertaken on a solution which is only partly homogeneous, and the results will obviously be only approximate and will show larger variations in a given mucilage than would be tolerated if a normal solution were being examined. It seemed, however, possible that by a regulated amount of heating, a mucilage might be prepared which was sufficiently homogeneous for measurement in a viscometer, yet retained at the same time sufficient of its mucilaginous properties to be used as a means of testing samples of tragacanth.

The glass viscometer used was the official viscometer of the British Pharmacopœia, 1932, agreeing with the

BRITISH PHARMACEUTICAL CONFERENCE 1934

British Standard Specification No. 118, 1929. All viscosities were measured at 20.0° C., the viscometer being immersed in a glass tank filled with water at this temperature. The constant of the instrument was found by observations using pure rape oil of known viscosity. It was found that alcohol or acetone delayed the destruction of the mucilage by heat for a considerable period of time, and if considerable amounts of these liquids were present it was necessary to heat for a long period in order to obtain a satisfactory mucilage at all. However, it is not usual to employ mucilages containing a high percentage of alcohol, so that experiments in this direction were discontinued. An aqueous mucilage containing 0.4 per cent. of gum prepared from a good sample of tragacanth gave a time value of about 600 seconds, using the above viscometer. This strength of mucilage was therefore employed.

The sample of gum, if whole, was powdered and a sample selected which passed a sieve of 30-mesh, but not of 60. If the gum was already powdered it was used as such, although some powders on the market will pass a sieve of 180-mesh and are therefore not strictly comparable with samples from the whole gum. 0.4 gm. of powder was weighed into a 230-mil flask and 2.5 mils of alcohol was added, followed by 100 mils of water. The latter was added quickly while the flask was continuously rotated. At this stage no large undispersed masses of gum should be visible. The solution was allowed to stand for exactly five hours, during which time it was gently shaken at the end of each half-hour. The flask was then fitted with an efficient reflux condenser and was completely immersed in a bath of boiling water for exactly one hour. At the end of this time it was withdrawn and was rapidly cooled to 20° C. with constant shaking. It was allowed to stand overnight at a temperature of approximately 20° C. in an incubator, and the viscosity was measured in the morning.

Sample and nature of original gum	Fall of ball in seconds	Viscosity in poises	Density of aqueous solution at 20° C.	Viscosity of 0·3 per cent. solution in 20 per cent. alcohol	Density of alcoholic solution at 20° C.
A Whole ...	14·5, 14·0, 14·5	1·07	0·9984	0·63	0·9788
B Whole ...	76·4, 77·4, 75·0	2·37	0·9986	0·87	0·9789
C Whole ...	117·2, 112·0, 112·4	2·44	0·9982	1·02	0·9788
D Whole ...	121·0, 124·6, 119·4	2·81	0·9985	0·88	0·9788
E Fine powder	12·2, 12·4, 10·4	1·37	0·9984	0·90	0·9787
F Fine powder	78·8, 67·4, 65·4	3·11	0·9984	1·52	0·9787
G Fine powder	145·0, 154·0, 142·6	3·01	0·9982	1·64	0·9787
H Whole ...	100, 93, 97	2·35	0·9986		
I Whole ...	16·2, 16·2, 14·5	1·45	0·9984		
J Whole ...	88, 89, 87·5	2·69	0·9987		
K Whole ...	107·5, 95, 100·0	2·81	9·9985		
L Whole ...	73, 69, 80	2·35	0·9984		
M Whole ...	93, 91, 90	2·41	0·9984		

The preceding table gives the results obtained on samples of gum from different sources. For purposes of comparison the mucilages have been compared by the falling shot method of Evers and McLachlan. Viscosities of a 20-per-cent. alcoholic mixture containing 0.3 per cent. of gum have also been given for comparison. These were prepared as described above, except that the time of heating was two hours instead of one.

The viscosity results show in some cases big divergences from the results shown by the falling shot method. This is not noticeable in the case of the fine powders. The explanation lies in the fact that the original falling shot method does not lay sufficient stress on the fact that the tragacanth must not be allowed to form visible undispersed masses when the mucilage is initially prepared. If this occurs, the masses are never entirely broken down and quite erroneous results may follow. Two mucilages were prepared from the same sample of gum and the viscosities were measured. In one case the average figure was 2.97 poises, and in the other 2.87 poises. Of all the results on the two solutions the maximum figure was 3.04 poises and the minimum 2.80. There is therefore a possible error of about ± 0.1 poise in the results obtained.

Summary

It is suggested that the comparison between samples of gum tragacanth should be made by comparison of the viscosities of 0.4-per-cent. aqueous mucilages in poises at 20.0° C. If a gum gives a mucilage with a viscosity above 2.5 poises it may be regarded as of good quality.

The author thanks Allen & Hanburys, Ltd., and Mr. Norman Evers.

The first of these two papers was presented by Mr. Brindle, the second by Mr. Evers.

Discussion

The Chairman said these were two useful papers leading to the fixing of B.P. standards. Mr. Haddock's idea of expressing viscosity in absolute units appealed to pharmacists, who liked to get down to first principles.

Mr. Deane pointed out that the viscosity as measured by the falling ball appeared to be unrelated to the suspending power. The late Mr. Brewis concluded that the slight heat evolved on grinding would not account for loss of suspending power. With any powder finer than No. 90 mesh the loss was rapid. Possibly the coarser powders retained some of the cellular structure of the gum. The method of the falling ball was not suitable because too short a fall occurred before measurement began. The wall of a narrow tube had a decided effect on the rate of fall ; the cylinder should be of 3-inch diameter. The commercial grading of gum was done on appearance, with the result that there was a slight overlapping of grades.

Mr. Beardsley had found a difference between mucilage from gum ground in a laboratory and that from gum ground in a mill. Tragacanth powder was being spoiled by the desire to get a white product.

Mr. Page inquired whether there was a definite relation between viscosities before and after heating.

Mr. Bird said that powdered gum had the greatest interest for the pharmacist, and different results were obtained with different gums. The ideal would be a standard viscosity and this paper paved the way. Had the authors found any alteration in the viscosity of dry powdered gum on keeping?

Mr. Evers remarked that it was awkward that diluted mucilage did not agree in results with strong mucilage. Mr. Brindle's test could only be properly used with standard samples.

Mr. Brindle pointed out that Mr. Haddock was comparing samples to get a standard, while he and Mr. Burlinson were using samples of mucilage.

BRITISH PHARMACEUTICAL CONFERENCE 1934

MR. WALLIS remarked that the calcium carbonate might not be uniform throughout.

THE CHAIRMAN said they might live to see an "international standard calcium carbonate." (Laughter.)

REPLIES

MR. BRINDLE, replying, said that he and Mr. Burlinson did not examine the calcium carbonate microscopically, but their results were easily reproducible.

MR. EVERS, also replying, said he had found a considerable amount of heat was produced in grinding, and he put down the loss of viscosity to that; there was, however, some loss on grinding without heat. Viscosity depended on some of the structure of the gum being preserved. Viscosity was mainly according to price, with marked exceptions. Tragacanth powder kept better in a moist atmosphere. More work was required.

Science Section

Wednesday Afternoon

The next paper, read by Professor McSwiney, was on:—

The Relation between Chemical Constitution and Purgative Action

By A. P. T. EASSON, J. HARRISON, B. A. MCSWINEY and F. L. PYMAN

[ABSTRACT]

THE synthetic purgatives phenolphthalein, diacetyldiphenolisatin ("Isacen") and 1-8-dihydroxyanthraquinone ("Istizin") have characteristics in common, for each contains two phenol residues linked by a carbon atom. The authors, after reviewing previous work, have prepared a series of di-(*p*-hydroxyphenyl)-dialkyl (or aryl) methanes and of the homologous series derived from *o*-cresol. They find that most of the members of the two series possess purgative properties. A number of lactones (14 to 18 below) were also tested for purgative action, the results being described in the physiological section of the paper.

Chemical Section.—Di-(p-hydroxyphenyl) or *Di-(4-hydroxy-3-methylphenyl) methane derivatives.* All the compounds of this class (except No. 7, Table I) were prepared by saturating mixtures of the appropriate aldehyde or ketone and an excess of phenol or *o*-cresol with dry hydrogen chloride. After keeping for several days at room temperature, the desired products crystallised out, and were purified by recrystallisation, usually from benzene. They are all readily soluble in alcohol or acetone, fairly readily soluble in benzene, but very sparingly soluble in water, about 0.01 to 0.001 per cent. Di-*p*-hydroxytetraphenyl methane was made by the interaction of benzophenone chloride with phenol.

The three *tritanolactones* were prepared by heating (*a*) benzilic acid with resorcinol; (*b*) benzilic acid with hydroquinone monomethylether; and (*c*) *pp'*-dimethoxybenzilic acid with resorcinol.

2:5-Dihydroxydiphenylmethanecarboxylic acid lactone was prepared by the condensation of mandelic acid with hydroquinone by means of 70 per cent. sulphuric acid.

α-(2-Hydroxy-5-methylphenol)-phthalide was prepared by the condensation of *p*-cresol with phthalic anhydride, and reduction of the product.

Table I records the yields and melting points of the compounds prepared together with the recorded melting points of those previously known.

Physiological Section.—The purgative action of the compounds was investigated, using mice, rats and dogs. The substance to be tested was given by stomach tube to mice or rats, either in solution or in the form of suspension in water or in olive oil. If the substance had a purgative action, the toxic dose was established by giving two or three times the purgative dose to dogs and making a *post-mortem* examination for inflammatory lesions. The results are summarised in Table II.

TABLE I

No.	Name	Yield (per cent. of theory)	M.p. (found)	Literature m.p. (if known)
1	*aa*-Di-(*p*-Hydroxyphenyl)-*n*-heptane	19	111°	103° C.
2	Di-(*p*-Hydroxyphenyl)dimethylmethane	56	153–4°	153° C.
3	*Di-(p-Hydroxyphenyl)methylethylmethane*	48	124–5°	—
4	*Di-(p-Hydroxyphenyl)methylpropylmethane*	30	150°	—
5	Di-(*p*-Hydroxyphenyl)diethylmethane	25	200°	198–200° C.
6	Di-(*p*-Hydroxyphenyl)methylphenylmethane	78	187°	187–188°C.
7	Di-*p*-Hydroxytetraphenyl-methane	60	286°	286° C.
8	Di-(*p*-Hydroxyphenyl)-1:1-cyclohexane	73	185–8°	186° C.
9	*aa*-Di-(4-*Hydroxy-3-methylphenyl-n-heptane*	20	86–87°	—
10	Di-(4-Hydroxy-3-methylphenyl)-dimethylmethane	70	137–9°	136° C.
11	*Di-(4-Hydroxy-3-methylphenyl)-methylethylmethane*	70–100	145–7°	—
12	*Di-(4-Hydroxy-3-methylphenyl)-methylphenylmethane*	6·5	142–3°	—
13	*Di-(4-Hydroxy-3-methylphenyl)-1:1-cyclohexane*	74	191–2°	—
14	2:4-Dihydroxytritanolactone ...	100	168°	168° C.
15	*2-Hydroxy-5-methoxytritanolactone*	50	127–9°	—
16	*2:4-Dihydroxy-4:4"-dimethytritanolactone*	50	167–8°	—
17	2:5-Dihydroxydiphenylmethane carboxylic acid lactone	65	154–5°	153–4° C.
18	*a-(2-Hydroxy-5-methylphenyl phthalide*	38	171°	—

TABLE II

No.	Type	R	R'	Purgative action
1	(IV)	C_6H_{13}	H	—
2	(IV)	Me	Me	—
3	(IV)	Me	Et	+++
4	(IV)	Me	Pr	<No. 11
5	(IV)	Et	Et	<No. 11
6	(IV)	Me	Ph	++; toxic?
7	(IV)	Ph	Ph	++
8	(IV)	RR' = *cyclo*hexanone residue		++; toxic?
9	(V)	C_6H_{13}	H	<No. 11
10	(V)	Me	Me	<No. 11
11	(V)	Me	Et	+++
12	(V)	Me	Ph	<No. 11
13	(V)	RR' = *cyclo*hexanone residue		+++; toxic
14	Lactones			+++
15				—
16				<; toxic
17				++
18				—

SUMMARY

A new series of substances containing the hydroxyphenyl group has been prepared and tested in an endeavour to correlate chemical constitution with purgative action. In addition an examination was made for harmful effect with variation in composition. The chemical part of this work was carried out in the laboratories of Boots Pure Drug Co., Ltd., and the physiological part in the University of Leeds.

DISCUSSION

THE CHAIRMAN said it was gratifying that Professor McSwiney and his colleagues used the medium of the Conference to publish this paper. He was interested by the realisation that fairly definite means of investigating purgative action of drugs and expressing their relations existed.

PROFESSOR BURN remarked on the interesting results of this work. The paper opened up a very wide field.

MR. WALLIS said he understood some workers used water fleas for testing purgative action.

PROFESSOR MCSWINEY doubted if this method would be satisfactory.

MR. CHAMINGS said it was stated that certain constituents in drugs were responsible for purgative action.

BRITISH PHARMACEUTICAL CONFERENCE 1934

PROFESSOR MCSWINEY replied that there appeared to be different groups which gave purgative action.

MR. BORDMAN said the action of phenolphthalein was greater in yellow samples.

MR. GRIER asked to what constituents the purgative action was due. He mentioned cascara and inquired if the action was due to resin.

MR. GILMOUR said as pharmacists they had been told that calomel triturated until yellow became much more active. This seemed to indicate that a physical difference gave a drug a different physiological action.

The next paper, presented by Mr. Crews, was:—

The Fluorescence Test for Olive Oils

By T. TUSTING COCKING and SYDNEY K. CREWS

[ABSTRACT]

RECENTLY there have been offered numerous samples of olive oil having fluorescence properties entirely different from those previously met with. Instead of the transparent pale blue, yellow or orange colours formerly seen, these samples exhibit opaque dark purple or chocolate coloured fluorescences which mask completely any blue fluorescence that may be due to the presence of an adulterant or to the treatment of the oil during "refining." With a normal olive oil, the addition of 5 per cent. of tea-seed oil produces a slight but distinct blue fluorescence, but with the purple fluorescent oils as much as 20 per cent. of the same tea-seed oil could be added before any blue fluorescence became visible. As it seemed probable that the peculiar fluorescence observed with these oils was due to the presence of some substance added for the purpose of masking the blue fluorescence of an adulterant, experiments were carried out to see if it were possible to remove the darkly fluorescent substance without affecting the pale blue fluorescent material present in tea-seed oil, "refined" oils and other adulterants. It was found that when a genuine virgin olive oil, exhibiting a deep golden yellow fluorescence, was treated repeatedly with decolorising charcoal, and then filtered, the resulting oil was almost water-white in colour, and showed only the faintest dull blue fluorescence in filtered ultra-violet radiation. When a similar treatment was applied to arachis oil, sesame oil, tea-seed oil, and "refined" olive oil, they were bleached, but retained their original blue fluorescence with little or no alteration. Repeated treatment of the oils with small quantities of decolorising charcoal was found to be more efficacious than one treatment with a large amount, and after numerous experiments the following technique was finally adopted:—

To about 100 mils of the oil, 5 gm. of decolorising charcoal was added, in portions of about 1 gm. at a time, over a period of six to eight hours, the mixture being frequently shaken during that time. After allowing to stand overnight to settle, the supernatant oil, which was almost clear, was poured off and filtered. The examination of the oils was carried out in thin glass bottles, the glass of which showed no fluorescence. A large K.B.B. quartz mercury vapour lamp was used as the source of illumination, and the light was filtered through Chance's "ultra-violet" glass. The transmission of this glass is stated by the makers to be from 3100 to 3900A, consequently very little visible light is passed.

Promising results were obtained when mixtures of genuine olive oil with other oils were examined by this method. The olive oil used exhibited a golden yellow fluorescence, and, while the addition of 5 per cent. of arachis or tea-seed oil was just sufficient to impart a very faint blue tinge to the fluorescence, the same mixture showed a very distinct blue fluorescence when the yellow fluorescent constituent was removed by the charcoal treatment. When the darkly fluorescent oils were treated in this manner, the dark fluorescence was removed entirely, leaving, in the case of those oils which were apparently genuine, only faint blue fluorescences, but with oils having low Bolton-Williams numbers, very distinct blue fluorescences in every case.

In the following table are shown the results of the visual examination of a number of oils, both before and after treatment with decolorising charcoal:—

No.	Kind of oil	Description of fluorescence		Bolton-Williams number	Remarks
		Original oil	After charcoal treatment		
1	Italian	Deep greenish-yellow.	Pale greenish-blue.	206	Genuine oil.
2	Italian ...	Bluish ...	Deep bright blue	169	Adulterated probably with tea-seed oil.
3	Italian ...	Slate-blue ...	Pale blue.		
4	Italian ...	Yellow ...	Almost transparent, very pale blue-green.	211	Genuine.
5	Spanish ...	Deep yellow...	Pale blue, almost transparent.	199	Genuine.
6	Spanish ...	Deep yellowish-grey.	Pale blue ...	190	
7	Spanish ...	Deep orange-yellow.	Very pale, almost transparent bluish-green.	204	Genuine.
8	Spanish ...	Almost opaque yellowish-grey.	Opaque pale blue.		Virgin.
9	Spanish ...	Almost opaque orange-grey.	Very pale bluish-grey.		Virgin.
10	French ...	Smoky yellow	Bright blue.		
11	French ...	Light purple	Bright blue.		
12	French ...	Dull reddish-orange.	Transparent pale blue.		
13	Pharmaceutical	Reddish-purple	Brilliant blue...	218	Slight reaction for sesame oil.
14	Pharmaceutical	Deep maroon	Brilliant blue...	218	Slight reaction for sesame oil.
15	Pharmaceutical	Grey with yellow tinge.	Pale luminous blue.	172	
16	Pharmaceutical	Reddish-purple	Brilliant blue...	196	
17	Pharmaceutical	Opaque blue-grey.	Brilliant luminous pale blue.	164	
18	Cheap edible oil	Bright blue ...	Bright blue.		
19	Refined ...	Bright blue ...	Bright blue.		
20	Palestine refined oil.	Pale blue ...	... ...	—	Edible quality.
21	Sulphur oil ...	Dull opaque purple.	... ...	—	
22	Refined (?) ...	Dull opaque blue.	... ...		? heat treated or contains tea-seed oil.
23	Refined oil ...	Luminous deep blue.	... ...	—	Pale green colour.
24	Refined oil ...	Luminous pale blue.	... ...	—	Slightly rancid.
25	No. 24 filtered through acid washed "earth."	Slightly luminous, pale blue.	... ...	—	
26	Refined tea-seed	Bright luminous blue.	Little change...	—	
27	Crude tea-seed	Opaque slate grey.	... ...	—	

Although at this stage it is not possible to state with certainty that an oil showing a blue fluorescence after treatment with charcoal is either "refined" or adulterated, yet evidence is accumulating that more than a faint blue colour is not given by virgin oils. It has been established that oils giving a low Bolton-Williams number invariably exhibit bright blue fluorescence after treatment with charcoal, and such oils should be regarded with grave suspicion. From the laboratories of The British Drug Houses, Ltd.

DISCUSSION

THE CHAIRMAN remarked that this method was being more and more used. It was rather shocking that people could learn what to add to an oil so as to baffle the analyst. Was there any guess as to the substance which masked the fluorescence?

MR. POWELL pointed out that chlorophyll gave a fiery-red fluorescence, even in a small quantity. There was undoubtedly a certain amount of colouring practised for market purposes.

MR. WIDDER called attention to the method of a previous author for the identification of chlorophyll under the lamp.

BRITISH PHARMACEUTICAL CONFERENCE 1934

MR. EVERS asked if it was possible to remove the substance which produced the blue fluorescence. He had never found the Bolton-Williams method of much value.

MR. MORRISON said he had had a letter asking what colour he liked to fluoresce. (Laughter.)

MR. CREWS, replying, said that in this process it was very difficult to find the exact chlorophyll bands; one seemed to find chlorophyll degradation products. He had no information as to removing the substance which produced the blue fluorescence.

The next paper, presented by Mr. Powell, was:—

The Loss of Phenol from Phenol Lozenges

By C. A. HILL and A. D. POWELL

[ABSTRACT]

ALTHOUGH the footnote to the official monograph for the phenol lozenge of the British Pharmacopœia states that each lozenge contains approximately 0.03 gm., or ½ grain, of phenol, the amount of liquefied phenol directed to be used makes no allowance for unavoidable loss of phenol during the drying process. Subsequent to manufacture, the lozenge continues to lose phenol. Using Wilkie's method and carrying out the test directly on a solution of the lozenge base, the authors found that the absorption of iodine by the materials of the lozenge base averaged 0.45 mil of *N*/10 per gm. The error introduced by this absorption may vary from 2 to 5 per cent., according to the strength of the lozenge. Using the Koppeschaar method, they found this error to be higher, averaging 0.75 mil of *N*/10 bromine per gm. The distillation method suggested by Corfield and Mundy was tested on samples of lozenge base, containing no added phenol, in order to determine how far this treatment would reduce errors due to interference. This method consists in distillation from an acidified solution, to which has also been added calcium chloride. It was found that an absorption of halogen occurred when the distillate was tested by either of the methods mentioned above. The absorption was of the same order, whether Wilkie's or Koppeschaar's method was used, and introduced an error as high as, or higher than, that given by the direct test. The absorption from each gm. of lozenge base, distilled after addition of calcium chloride, but omitting the hydrochloric acid was, however, reduced to 0.15 mil of *N*/10 iodine (or 0.15 mil to 0.20 mil of *N*/10 bromine in the Koppeschaar test). If the quantity of phenol distilled is reduced, by distilling an aliquot of a solution of the sample, and no acid or salts added, the distillate from the base has a negligible iodine absorption. With the smaller amount of organic matter in the distillation flask, there is no trouble through frothing, and the omission of calcium chloride does not result in loss of phenol through incomplete distillation. The aliquot taken should contain not more than 25 mgm. of phenol, the whole of the distillate being taken for the determination.

Distillation of a standard solution of phenol in this manner gave the following results:—

	Mils of *N*/10 Iodine
20 mils of standard solution required	12·59
20 mils diluted to 150 mils and distilled required	12·54
20 mils plus 1 gm. sugar diluted to 150 mils and distilled required	12·60
20 mils plus 1 gm. lozenge base diluted to 150 mils and distilled required	12·59
20 mils plus 0·8 gm. lozenge base diluted to 150 mils and distilled required	12·57
No phenol, 0·8 gm. lozenge base diluted to 150 mils and distilled required	0·03

The lozenges are first weighed, and crushed. A convenient weight of the crushed material, usually about three to four gm., is dissolved in water, and the solution adjusted to a volume of 100 mils. Twenty-five mils of this solution is placed in a 300 mil flask, and diluted with water to a volume of 150 mils. The flask is fitted to a condenser, and the contents distilled until only about 5 mils remain in the flask. An asbestos ring should be used to prevent overheating. Distillation may be rapid at first, but towards the end caution is required to prevent overheating and possible charring of the residue. The distillate is collected in a 300 mil stoppered bottle, and the temperature brought to about 20° C. Thirty mils of *N*/10 iodine and 30 mils of *N*/10 sodium carbonate are added, and the mixture allowed to stand for five minutes. The mixture is then acidified by the addition of 5 mils of dilute sulphuric acid, and the excess iodine is titrated with *N*/10 sodium thiosulphate. Each millilitre of *N*/10 iodine is equivalent to 0.001567 gm. of phenol. The amount of iodine remaining in excess should be at least as much as the amount absorbed.

The loss of phenol from lozenges stored under different conditions was determined on the following series of samples:—(*a*) Reference samples. These had been kept in the dark in a cool place, in glass jars closed with a metal screw cap. (*b*) Samples withdrawn from pharmacies. Most of these samples were taken from glass shop "rounds." Others had been stored in the wide-mouthed glass bottle, closed with a cork, in which they were issued. (*c*) Samples from unopened warehouse containers. These were in wide-mouthed bottles of amber

TABLE I.—REFERENCE SAMPLES

Sample No.	Phenol content when prepared. Gm. per lozenge	Phenol content when re-examined Gm. per lozenge	Period of Storage	Loss of Phenol
			Months	Per cent.
1	0·0308	0·0222	12	28
2	0·0302	0·0222	12	26
3	0·0295	0·0234	11	20
4	0·0303	0·0247	6	18
5	0·0303	0·0243	5	19
6	0·0297	0·0244	5	18
7	0·0289	0·0244	4	15
8	0·0303	0·0274	2	9
9	0·0289	0·0272	1 month	6

TABLE II.—WITHDRAWN FROM PHARMACIES. STORED IN SHOP "ROUNDS" OR IN ORIGINAL CONTAINER.

Sample No.	Phenol content when returned. Gm. per lozenge	Remarks
1	0·0231	
2	0·0217	
3	0·0200	
4	0·0259	
5	0·0239	
6	0·0207	
7	0·0216	
8	0·0189	17 months old.
9	0·0178	15 months old.
10	0·0197	In original bottle 18 months old. Strength when made 0·0292 gm. per 1 oz.

TABLE III.—MISCELLANEOUS

Sample No.	Phenol content at beginning of test. Gm. per lozenge	Phenol content at end of test. Gm. per lozenge	Loss of Phenol. Gm. per lozenge	Remarks
1	0·0189	0·0131	0·0058 (approx. 2 mgm. per month)	This is sample 8 Table II, which was kept 3 months in a cardboard box wrapped in paper.
2	0·0178	0·0045	0·0133 (approx. 4 mgm. per month) .	This is sample 9, Table II, which was kept 3 months wrapped in paper.
3	0·0297	0·0244	0·0053 (approx. 1 mgm.)	This was the last few ounces from a 7-lb. jar examined about 5 months after manufacture.

BRITISH PHARMACEUTICAL CONFERENCE 1934

glass, closed with a shive, and paper sealed. They contained a padding of waxed paper shavings, and were stored in a cool place at a uniform temperature. (*d*) Samples in cardboard boxes or in paper. The results of these tests are shown in the following tables. The figures in the first table were determined by the direct method, but have been corrected for error due to the effect of the base materials.

An examination of the figures obtained shows that the average loss per month under normal storage conditions may vary from ½ to 1 mgm. of phenol per lozenge. In containers which have been kept at various pharmacies and opened from time to time, the average loss per month is approximately 1 mgm. per lozenge. The rate of loss is the same from jars with metal cap. Lozenges which were transferred to cardboard boxes lost 2 mgm. per month, and in paper the loss was increased to between 4 and 5 mgm. per month.

In order to determine how far the loss of phenol was the result of volatilisation through the cork and disc, and how far due to absorption by the packing materials, a series of tests was made on an unopened 1 lb. bottle of amber glass, closed as above described, with waxed paper shavings and cork shive covered paper seal. This bottle had been stored for about fifteen months in a cool place. It contained 400 lozenges, which at the time of filling had an average phenol content of 0.030 gm. per lozenge, the total phenol content being, therefore, 12 gm. At the end of fifteen months it was found that the phenol was distributed as follows:—

	Phenol content	Amount of Phenol
Paper seal	0·6 per cent.	0·0014 gm.
Cork shive	5·9 per cent.	0·291 gm.
Waxed paper shavings	6·1 per cent.	1·373 gm.
Dust on inside of jar	—	0·002 gm.
Lozenges in upper part of bottle ...	0·0236 gm. per lozenge.	
Lozenges in lower part of bottle ...	0·0264 gm. per lozenge.	
Total phenol present in lozenges ...		10·000 gm.
Total phenol accounted for ...		11·668 gm.
Loss of phenol		0·332 gm.

It will be seen that the phenol remaining within the bottle, if equally distributed among the lozenges, would be equivalent to 0.029 gm. per lozenge, but actually, owing to absorption by the waxed paper and cork, the strength of the lozenges was on the average about 17 per cent. below the original figure.

Summary

1. The loss of phenol from phenol lozenge B.P. is considerable under all ordinary conditions of storage, and an average loss of 1 mgm. per lozenge per month is to be expected under the conditions of storage which obtain in most pharmacies.

2. The determination of phenol, either directly or on a distillate, may be affected by the materials of the lozenge base, unless suitable conditions are observed. Details of distillation are given which reduce this liability.

3. The strength of phenol lozenge B.P. is usually below 0.03 gm. per lozenge unless tested shortly after manufacture, and it is suggested that the standard should not require more than 0.02 gm. to be present in each lozenge.

This work was carried out in the laboratories of Boots Pure Drug Company, Ltd.

Discussion

The Chairman said it was certain that before new standards were inserted in the Pharmacopœia there must be considerable experiment and experience; but, he would add, the limits of the standards should not be so wide as to relieve the pharmacist of the necessity of precaution in storage.

The President inquired whether Mr. Powell had had experience of phenol lozenges kept in a bottle and covered so as to exclude light.

Mr. J. Rutherford Hill recalled an incident, some years ago, of a sample of phenol lozenges being brought to him in a bottle with the phenol crystallised on one side of the bottle. He came to the conclusion that there was no means of standardising phenol lozenges.

Mr. Corfield expressed satisfaction that the authors' results confirmed those presented by him at the Aberdeen Conference in 1932. Perhaps further consideration should be given to the question of the addition of calcium chloride in distilling.

Mr. Powell, replying, said that possibly the paper round a bottle containing the lozenges prevented volatilisation by the rays of the sun. If calcium chloride was used without hydrochloric acid in the distillation there was considerable frothing.

The next paper, presented by Mr. Beardsley, was:—

The Determination of Mercury in Hydrargyrum Cum Creta

By W. J. Beardsley and B. J. Styles

[Abstract]

We have found during routine examinations of mercury with chalk that the method described in the B.P. 1932 for estimating the mercury is inclined to give low and rather erratic results. Experiments were conducted to ascertain a means, if possible, of overcoming this fault and correcting the process in order to obtain consistent results. The thiocyanate method for the determination of mercury is known to be only applicable when that metal is in its mercuric condition, and this led us to believe the B.P. method of procedure did not give all the mercury in a suitable state for titration with thiocyanate. We therefore aimed at complete oxidation. We found by increasing the nitric acid to 20 mils much higher results were obtained, but slight variation in them persisted. The difficulty was overcome by treating the solution after boiling with potassium permanganate until a permanent pink colour was produced, assuming that any mercurous compound is oxidised into the mercuric state, a trace of ferrous sulphate being added to just decolorise the liquid and then the titration continued in the usual way. Uniform results were obtained with ease, and we submit this as a distinct improvement on the B.P. assay. As an example of the difference between the B.P. assay and the method used by ourselves, the following results are given from the same sample of mercury with salt:—

	No. 1	No. 2	No. 3
B.P. assay ...	27·9 per cent.	28·6 per cent.	29·6 per cent.
New method ...	33·95 per cent.	33·95 per cent.	33·95 per cent.

Our method is as follows:—Boil about 1 gm., accurately weighed, with 20 mils of nitric acid and 25 mils of water for five minutes, cool and add sufficient solution of potassium permanganate to produce a permanent pink colour, decolorise with a weak ferrous sulphate solution and titrate with N/10 ammonium thiocyanate, using ferric ammonium sulphate as indicator. Each mil of N/10 ammonium thiocyanate is equivalent to 0.01003 gm. of Hg. The B.P., 1932, advises the above procedure in the assay of mercury ointment and mercury pill. It is also essential when estimating the mercury in mercury with chalk. From the analytical laboratory of National Drug Industries, Ltd.

Discussion

The Chairman said this was another case of the Pharmacopœia being put right. (Laughter.)

Mr. Powell remarked that his findings were in agreement with the authors'.

Mr. Beardsley expressed his satisfaction at this result.

BRITISH PHARMACEUTICAL CONFERENCE 1934

The next paper, presented by Mr. Corran, was:—

Further Studies on Mercurochrome

By F. E. Rymill and R. F. Corran

[Abstract]

The research is a continuation of the work of Mitchell, being an attempt to apply fractionation to the elucidation of the composition of mercurochrome. Initial experiments concern mercuration in a homogeneous reaction mixture, using alcohol-water solvent, as follows:—

Dibromfluorescein was dissolved in caustic soda solution, diluted with a mixture of alcohol and water (2:1) and the dye reformed by the addition of glacial acetic acid, the dye remaining in solution. Mercury in the form of a solution of mercuric acetate in alcohol-water mixture (1:1) was then added to the solution of the dye, and the homogeneous mixture thus obtained refluxed until no ionic mercury remained, three hours being the maximum time of refluxing required. Interaction commenced almost immediately, as evidenced by the formation of a precipitate immediately the mixture was warmed, the resultant mercurated product being only slightly soluble in the solvent mixture used. The products of reaction were precipitated completely by dilution with a large excess of water and addition of dilute sulphuric acid, washed thoroughly until free from sulphate, converted to the disodium salt (i.e. mercurochrome) and scaled.

The following are the results of three experiments:— Hg in scales (1) 26.3 per cent., (2) 26.7 per cent., (3) 27.2 per cent. The figures confirm the practicability of mercuration in an alcohol-water mixture as solvent.

Fractionation was carried out on the first precipitation products obtained with and without the use of heat and taking varying amounts of mercury. In all cases the end-product consisted of a highly mercurated compound (containing approximately 36 per cent. Hg) admixed with unchanged dibromfluorescein. The dark brownish-red precipitate resulting from the reaction is contaminated with metallic mercury, which is eliminated by forming the sodium salt and reprecipitating with acid. Commercial samples of mercurochrome were fractionated, the results supporting the view that similar mercurated products are obtained by this heterogeneous reaction (of White's original process) and the above homogeneous reaction. In none of the experiments was a compound obtained (containing 43.5 per cent. Hg) corresponding to a substitution of two mercury atoms in dibromfluorescein, all of them confirming the presence of a mercurated product with about 36 per cent. Hg. Whether this is a single compound or a mixture of mono-mercury and di-mercury substituted dibromfluorescein is still obscure. The method adopted for estimation of mercury was as follows:—

Dissolve 0.5 gm. of mercurated product in 50 mils of water containing 10 mils of caustic soda solution (40 per cent. w/v), and add 3 gm. of potassium permanganate. Boil gently over a micro burner for fifteen minutes with occasional stirring. Allow to cool slightly and acidify with 10 mils of concentrated sulphuric diluted to 200 mils with water. Now add hydrogen peroxide (10 vol.) gradually, avoiding loss by spirting, until all but a small amount of manganese compounds have dissolved. On boiling a clear water-white solution is obtained. Remove the excess hydrogen peroxide by adding solution of potassium permanganate drop by drop until a faint pink tinge persists, when addition of a solution of oxalic acid results in a clear water-white solution. Mercury is precipitated as sulphide, collected on a Gooch crucible, dried and weighed.

The method obviates precipitation of mercurous bromide, which occurs when oxalic acid is used to remove excess of permanganate. Acidification of the oxidised alkaline mixture leads to considerable loss of bromine. This can be explained by the partial oxidation of bromide to bromate during boiling with the ordinary solution. It would appear that if a reducing agent could be found to reduce any oxidised bromate to bromide, prior to acidification with dilute acid, the method described would be suitable for the determination of mercury and of bromine on the same sample. Recent experiments have indicated that alcohol may be satisfactory, duplicate mercury estimations with and without alcohol giving concordant results.

Summary

Mercuric acetate solution and dibromfluorescein react in a homogeneous phase, using an alcohol-water mixture as solvent, to give mercurochrome.

The product is a composite mixture similar to that obtained by the heterogeneous reaction of White.

The results of fractionation methods suggest that the components of the composite mixtures formed by both reactions consist of a mercurated dibromfluorescein containing approximately 36 per cent. of mercury and unchanged dibromfluorescein.

The determination of toxicity is an essential feature of the standardisation of mercurochrome, and further work is being carried out in this connection with the mercurated product.

The authors express their gratitude to the directors of Evans Sons Lescher & Webb, Ltd., and to Dr. H. A. Mitchell.

Discussion

The Chairman pointed out that there was a necessity to maintain a toxicity test.

Mr. A. J. Jones congratulated the authors, whose work was of added importance in view of other possible definitions of mercurochrome.

Mr. Corran, in reply, remarked that mercurochrome was to appear in the new British Pharmaceutical Codex, and it was important that its purity should be certain.

The next paper, presented by Mr. Hartley, was:—

The Use of Diphenylamine in the Assay of Saccharated Iron Compounds

By F. Hartley and W. H. Linnell

[Abstract]

A comparison of results obtained by the direct determination of ferrous carbonate in saccharated carbonate of iron by the methods of the 1914 and 1932 British Pharmacopœias discloses a serious discrepancy. Titration with $N/10$ potassium dichromate solution gave 47.99 per cent., using potassium ferricyanide as an external indicator, against 51.6 per cent. when diphenylamine is employed as an internal indicator. Attack of carbohydrate should be inappreciable, since the diphenylamine changes colour only in the presence of excess of oxidising agent. Examination for total iron and ferric iron indicated that about 23.0 per cent. of ferrous iron was present, equivalent to 47.71 per cent. of ferrous carbonate—a figure agreeing with that with the external indicator, and the reverse of that expected from prior statements. A series of experiments shows that variation in the quantity of phosphoric acid used affects the sharpness of the end-point and also lowers the result when diphenylamine is used as internal indicator. The general inference from the results is that the presence of carbohydrate increased the dichromate readings with diphenylamine, whereas the increase is negligible with potassium ferricyanide. Attempts to obtain a correction factor failed. It is suggested the oxidations take place in the following order: ferrous iron; carbohydrate; indicator.

Increase in phosphoric acid used did not decrease the quantity of potassium dichromate required.

Summary

The official method for the determination of ferrous iron in saccharated carbonate of iron yields figures which are about 7 per cent. too high. The variations observed are attributable to the presence of carbohydrate.

The results are sensitive to experimental conditions, hence the amount of the sample taken must be closely controlled and the temperature at which the determination is carried out should be specified more exactly.

Titration with potassium dichromate, using potassium ferricyanide as indicator, is in every way preferable to the official process.

Discussion

The Chairman said it was interesting to find the ferricyanide indicator returned to. He himself had been brought up on ferricyanide. (Laughter.)

Mr. Dyer, in congratulating the authors, pointed out that Mr. Liverseege had made a useful comment on a paper presented by Messrs. Dyer and Forbes at Cardiff in 1927.

Mr. Finney asked if diphenylbenzidine had been tried as an indicator.

Mr. Harrison replied in the negative.

The next paper (presented by Mr. Withell) was:—

The Fluorescence and Detection of Rhapontic Rhubarb

By T. E. Wallis and E. R. Withell

[Abstract]

It has been shown that the rhizomes of different species of rhubarb exhibit fluorescent effects when illuminated by ultra-violet light and that genuine Chinese rhubarbs from *Rheum officinale* and *R. palmatum* give a velvety brown fluorescence while rhubarbs derived from *R. compactum*, *R. undulatum*, *R. Emodi* and *R. Rhaponticum* give various shades of violet. It has therefore been suggested that this property might be utilised for distinguishing rhapontic rhubarb from the genuine article and for the detection of rhapontic rhubarb in admixture with the official drug. It therefore seemed desirable to make experiments with a view to investigating the nature of the fluorescence of rhapontic rhubarb, and in the light of experience gained to attempt to devise a reliable method of procedure. It is obvious that experiments on the fluorescence of capillary strips must be conducted with non-fluorescent absorbent paper. Filter papers were examined and found to consist entirely of cotton fibres which fluoresce with a marked blue fluorescence. A sample of cellulose wadding showed no fluorescence. A quantity of paper capable of absorption and made of cellulose wadding was therefore procured and used throughout the work. It was then decided to examine the effects of the various factors which could influence the fluorescence. In order to reduce as far as possible the amount of colouring matter in the solutions used for the fluorescence experiments, it was decided to extract the rhubarb with alcohol; actually industrial spirit (about 95 per cent. alcohol) was used and gave satisfactory results. The tinctures were prepared in the following manner:—1 gm. of the rhubarb in No. 60 powder was macerated with 50 mils of alcohol for eighteen hours. The liquid was filtered through paper No. 1 Whatman 11 cm. diameter and alcohol passed through the filter paper to make 50 mils.

The author then describes experiments, with strips of paper immersed in the above tincture, designed to find the effect on rhapontic rhubarb of: (1) Ultra-violet light on the violet fluorescence; (2) daylight on the fluorescence; (3) heat on the fluorescence; (4) ultra-violet light and daylight on the fluorescence of the powdered drug; (5) daylight on the maceration of the drug in alcohol. From these experiments it is apparent that to detect rhapontic rhubarb by utilising the fluorescence under ultra-violet light the experiments must be performed in the dark and the examination by ultra-violet light be conducted as expeditiously as possible. It is also evident that differences in the fluorescence of pure rhapontic rhubarb are to be expected according to whether the sample has been dried at high or low temperatures and whether it has been exposed to the daylight for long or short time, this latter condition applying more particularly to the powder. In view of these experimental results statements hitherto published with reference to the detection and estimation of rhapontic rhubarb must be regarded as being to a certain extent unreliable, since the authors concerned make no comment upon the action of ultra-violet light, daylight or heat in modifying the fluorescence.

One sample of rhapontic rhubarb was grown at Long Melford, and was supplied by Mr. H. Deane partly in a No. 40 powder and partly in the unground condition. A portion of the No. 40 powder was further reduced in the laboratory to a No. 60 powder so as to be comparable with the powdered Chinese samples. Two commercial samples of English rhapontic were examined and one commercial specimen of exotic rhapontic rhubarb (Austrian). The Chinese rhubarb examined were commercial samples.

Appearance of Rhapontic Rhubarb on Exposure to Ultra-Violet Light

A. Whole drug.

Sample	Appearance in ultra-violet light
a Supplied by Mr. H. Deane peeled.	A purple brown background with numerous brilliant violet fluorescent lines and patches.
b Supplied by Mr. H. Deane unpeeled.	A deep velvety purple fluorescence with brilliant violet patches where the cork had exfoliated. The cut ends showed a similar fluorescence with the additions of shining violet lines.
c and *d* Commercial specimens of English rhapontic.	A purple background with patches of violet fluorescence.
e Commercial Austrian rhapontic.	Similar to *c* and *d* but fewer violet patches.

B. Powder.—All specimens in No. 60 powder.

Sample	Appearance in ultra-violet light
a The powdered peeled specimen supplied by Mr. H. Deane.	A generally diffuse and brilliant violet fluorescence.
c and *d* The powdered commercial English rhapontic.	A dull violet fluorescence with brighter violet points.
e The commercial Austrian rhapontic.	A very vivid violet fluorescence with brilliant violet fluorescent points.

Appearance of Chinese Rhubarb on Exposure to Ultra-Violet Light

The dried unground specimens of Chinese rhubarb showed when exposed to ultra-violet light a red-brown fluorescence, with white or pale violet streaks occurring indiscriminately throughout the rhizome. The powders showed a red-brown fluorescence with no trace of violet.

Detection of Rhapontic Rhubarb

Ten per cent. of rhapontic rhubarb can be detected by the following method. About 0.5 gm. of the powder under investigation and the same quantity of powdered Chinese rhubarb (both of the same degree of fineness) are placed side by side on a sheet of glass. They are spread out in a thin layer with a spatula and exposed to ultra-violet light, being supported about 3 cm. below the Wood's glass. The genuine Chinese rhubarb showed a velvety brown fluorescence, while the sample containing 10 per cent. of rhapontic rhubarb gave a purple fluorescence.

Five per cent. of rhapontic rhubarb can be detected by following the above procedure but examining the powders with a hand lens; rhapontic rhubarb is evidenced by the presence of shining violet points.

Less than 5 per cent. of rhapontic rhubarb may be detected as follows:—One gm. of the powder under examination is macerated in 50 mils of alcohol for eighteen hours in the dark. At the end of that period the tincture is filtered through a No. 1 Whatman filter paper (of 11 cm. diameter) into a 50 mil flask and the bottle rinsed out with a little alcohol, which is poured through the filter paper to make up the volume to 50 mils. A tincture of genuine Chinese rhubarb is prepared under exactly similar conditions. The clear tinctures are then poured into evaporating basins and a strip of cellulose wadding paper is immersed completely in each of the liquids, removed by forceps, placed on a sheet of glass and dried in the dark for half an hour. The two dried strips are then supported on a sheet of glass at about

BRITISH PHARMACEUTICAL CONFERENCE 1934

3 cm. below the Wood's screen, and exposed to ultra-violet light. The presence of rhapontic rhubarb is denoted by a violet fluorescence in the strip under investigation. The strip prepared from genuine Chinese rhubarb is used for comparison. The examination must be conducted as rapidly as possible since the ultra-violet light destroys the fluorescence. By this means 2 per cent. of the rhapontic rhubarb supplied by Mr. H. Deane could be detected with certainty. In the case of the commercial Austrian rhapontic rhubarb as little as 1 per cent. could be detected by the above-mentioned procedure.

Summary and Conclusions

1. Filter papers vary in their behaviour under the influence of ultra-violet light; those composed of cotton fibres fluoresce blue, whereas paper made of wood cellulose does not fluoresce.

2. The violet fluorescence of rhapontic rhubarb is gradually destroyed on continuous exposure to ultra-violet light, and more slowly on exposure to daylight. Ultimately a yellow fluorescence remains.

3. Exposure to a temperature of 70° C. for eighteen hours markedly diminished the violet fluorescence of rhapontic rhubarb, and after raising the temperature to 100° C. for about 100 hours, a further reduction of the intensity of the fluorescence occurred.

4. Using genuine Chinese rhubarb as a standard for comparison, one can easily detect as little as 1 per cent. of added rhapontic rhubarb using paper strips soaked in a tincture made from the drug. The whole operation must be conducted in a dark room.

5. The wide variation in the intensities of the fluorescence of different samples of rhapontic rhubarb makes it very difficult to carry out exact quantitative determinations by this method.

Discussion

The Chairman characterised the authors' work as timely and interesting, and congratulated them. He asked if there was any evidence that rhapontic rhubarb was not as good as Chinese or other rhubarbs.

Mr. Deane could not say from experience whether there was any difference in the physiological action of rhubarb; but referred to work done in Vienna leading to the conclusion that, with one exception, all European rhubarbs were inferior to Chinese.

Mr. Saber congratulated the authors.

Mr. Wallis referred to results obtained at Manchester University, where a yellowish-green fluorescence was obtained with ultra-violet light on specimens that had been stored in daylight. Conference papers, he added, were not necessarily related to the British Pharmacopœia. There was a large commercial public interested in the purity of drugs.

Mr. Beardsley inquired what kinds of rhubarb had been used by the authors. The English variety had been specified in Government contracts for India.

Mr. Grier said that some years ago he and Professor Wild experimented with 10-gr. doses of powdered rhubarb of Chinese and of English origin, and found no difference in action.

Mr. Withell, replying, said they knew that Chinese rhubarb was efficacious, but they did not know this about rhapontic rhubarb. Commercial samples and museum specimens had been used by the authors.

The last paper was:—

A Note on Mercuric Oxycyanide B.P.

By F. C. J. Bird

[Abstract]

The characters and tests for mercuric oxycyanide in the B.P. are generally satisfactory, but there is one item, the subject of this note, which might with advantage be expressed differently, and that is the requirement that it should be soluble in eighteen parts of water. Of a number of samples examined, both of British and foreign origin, not one was found to be completely soluble; in every case a residue remained which, on inspection, might well be judged to amount to 30 to 40 per cent. of the salt taken. The following analysis of a solution in the B.P. proportions will serve to illustrate this—5 gm. of B.P. mercuric oxycyanide agitated for a considerable period with 90 mils of distilled water at 15.5° C., and the clear solution, separated from the residue, allowed to evaporate spontaneously to dryness.

	Dry salt	Percentage of total	HgO
Soluble portion ...	3·7 gm.	74	13·8 per cent.
Residue	1·3 gm.	26	42·29 per cent.

If now the solution containing the undissolved residue be heated to 71° C. the whole of the salt dissolves quite easily, and on cooling to 15.5° C. by immersion of the test-tube in water at that temperature the liquid remains clear with only a minute trace of deposit. Further, if kept at 15.5° C. for an indefinite period, no change takes place, but if the temperature be lowered by even a degree or two a few crystals form which induce a further small amount of crystallisation. One can only infer from this that cold water decomposes the oxycyanide and that at the higher temperature recombination takes place enabling the reconstituted compound (if it is really a loose chemical combination and not a mere mixture) to remain stable at the lower temperature whilst in solution. A parallel example is met with in mercuric oxychloride $HgO,HgCl_2$, which in Comey and Hahn's Dictionary of Chemical Solubilities, 1921, is stated to be "decomposed by cold H_2O." Seeing that official statements of solubility may be taken as evidence of conformity or otherwise with the requirements of the B.P. it seems desirable to modify the official text, and it is suggested that it would be an advantage for an alteration to be made as follows:—One part should readily dissolve in eighteen parts of boiling water with only a trace of residue, and the liquid should remain clear when cooled to 15.5° C.

There is one notable characteristic of mercuric oxycyanide B.P., and that is the difference in its behaviour towards heat when in the dry state and when in solution. At quite a moderate temperature the dry salt darkens in colour and decomposes very readily, and even when moist it is liable to deteriorate in colour if exposed to a very gentle heat. On the other hand, a strong solution can undergo prolonged and vigorous boiling without change. With regard to the official solubility of 1 in 18 this is apparently based on the figure of 1 in 17, which has been published for many years in various works of reference on the probable assumption that it was correct. In works of reference oxycyanide of mercury solution (1 in 200) is still credited with the advantage of not attacking steel instruments when used for sterilising them. A solution of this strength, however, attacks ordinary steel very energetically, even after a short immersion, the liquid becoming brown with a deposition of black flakes, whilst the metal is badly corroded. I have shown that as little as 1 per cent. of the weight of the oxycyanide used of sodium carbonate will prevent this action. It is worthy of note that stainless steel is quite unaffected under similar conditions. It will be found expeditious, in the preparation of solutions of mercuric oxycyanide, to dissolve the salt in about 40 parts of boiling water, and then add sufficient cold water to produce the required degree of dilution. The dissolving of oxycyanide of mercury in the cold is often tediously slow.

Discussion

The Vice-President (Mr. E. Saville Peck) said everyone welcomed the return of Mr. Bird to the Conference. When he (Mr. Peck) was secretary some years ago, and papers were not very plentiful, he could always rely on getting one out of Mr. Bird.

Mr. Pembridge said that mercuric oxycyanide was dispensed as an eye lotion of the strengths 1 in 8,000 or 1 in 10,000.

BRITISH PHARMACEUTICAL CONFERENCE 1934

MR. HARTLEY said that in Edinburgh the strength was 1 in 5,000.

MR. SOMMERVILLE said that in his experience a stock solution was kept for dispensing.

MR. JACKSON reported its use for irrigation of the bladder.

MR. BIRD briefly thanked those who had contributed to the discussion.

The following papers were taken as read:—

The Stability of Mixtures of Hydrogen Peroxide and Ethyl Alcohol

By W. A. WOODARD and J. PICKLES

[ABSTRACT]

MIXTURES of ethyl alcohol and solution of hydrogen peroxide (10 volumes) are prescribed as ear-drops. It is usual for these drops to be used separately, but some clinicians prefer to use the drops mixed, and it is common for patients to be supplied with drops for three- and six-month periods. Complaints received from patients led the authors to suspect the possibility of oxidation taking place during storage resulting in the formation of acetaldehyde and acetic acid in sufficient quantities to cause irritation.

The experimental work of this investigation has been based on the following considerations:—(1) The production under the influence of light, temperature, and catalysts, of acetaldehyde and acetic acid, the catalysts being supplied by certain soluble constituents of the glass bottles used for storage; (2) a comparison of the residual hydrogen peroxide content of mixed and unmixed drops. A sample of alcohol (95 per cent.) which conformed with the requirements of the B.P. was used, and the peroxide (10 vols.) was prepared by diluting a fresh sample of hydrogen peroxide (100 vols.); it conformed to the Pharmacopœia standards. Standard poison bottles of greenish-white colour were used for experiments in which light was required to play a part; amber-tinted bottles were used for comparative experiments. Samples of this glass were crushed to a fine powder and refluxed for one hour with a mixture consisting of equal parts of alcohol (95 per cent.) and hydrogen peroxide (10 vols.). All commercial glasses are considered to be practically insoluble in alcohol, but, on filtering the above liquid and concentrating to a low bulk, positive reactions were obtained for the following substances:—Sodium, calcium, silicates, slight reactions for heavy metals and for iron. The solutions indicated in the table were prepared and kept for a period of three months prior to examination.

Van Ecks test, ammoniacal silver nitrate and resinification with alkali were used as qualitative indications of the presence of aldehyde. With one exception, the qualitative reactions were not very marked and it was decided to use a method for quantitative estimations which would give reasonably accurate results in the presence of small quantities. A colorimetric method was used. The colorimetric reagent consisted of a modified Schiff's solution and comparisons were made in a Duboscq's colorimeter against a standard containing pure acetaldehyde in 50 per cent. ethyl alcohol (aldehyde free). Controls containing definite amounts of hydrogen peroxide were used to obviate any error. In order to indicate increase in acidity the initial and final PH of the mixture drops was determined by the capillator method using bromophenol blue and thymol blue as indicators. Controls were used in order to obviate interference with the indicators by the peroxide. The acetic acid content of the mixtures was determined by titration with standard alkali, using phenolphthalein as indicator and making due allowance for the initial acidity. Since ethyl alcohol is not oxidised by acid permanganate in the cold the process of the B.P. was used for determining the initial and final peroxide contents. The small amounts of acetaldehyde present were found by controls to be negligible in their effect upon the determinations.

TABLE OF RESULTS

Period of storage, three months.

Solution	Description	Per cent. H_2O_2 Initial	Per cent. H_2O_2 Final	Qualitative tests for aldehyde	Per cent. Aldehyde	Initial PH	Final PH	Per cent. Acetic acid
1	Ethyl alcohol and H_2O_2 (10 vols.). Stored in greenish-white bottles and exposed to bright light at 60° to 65° F.	3·234	1·872	Positive	0·44	4·8	2·6	1·150
2	H_2O_2 (10 vols.) stored under the same conditions as Solution 1.	3·234	2·373	—	—	—	—	—
3	Ethyl alcohol and H_2O_2 (10 vols.) in amber-tinted bottles stored under the same conditions as Solution 1.	3·234	2·221	Slight positive	Less than 0·1	4·8	4·6	0·12
4	H_2O_2 (10 vols.) stored under the same conditions as Solution 3.	3·234	2·911	—	—	—	—	—
5	Ethyl alcohol and H_2O_2 (10 vols.) stored in refrigerator at 35° F.	3·234	2·733	Doubtful reaction in all cases.	Not estimatible	4·8	4·8	Not estimatible
6	H_2O_2 (10 vols.) stored under the same conditions as Solution 5.	3·234	3·0	—	—	—	—	—

No. 1 (which represents conditions under which drops would be kept by the patient) shows the production of estimatible quantities of acetaldehyde and acetic acid. In Nos. 3 and 5 it is evident that the small quantities of oxidation product formed are negligible. Photochemical and thermal conditions as well as catalytic oxidation evidently play an important part in the reactions, this being evident from the results given by hydrogen peroxide alone. Although little more than 1 per cent. of acetic acid and 0.44 per cent. of acetaldehyde may seem insignificant from a technical point of view, in the opinion of aural surgeons these quantities are sufficient to cause irritation.

CONCLUSIONS

It is shown that mixtures of ethyl alcohol and hydrogen peroxide (10 vols.) when dispensed and stored under certain conditions give rise to yields of acetaldehyde and acetic acid possessing clinical significance in the treatment of otitis media. The residual peroxide content of mixtures is shown to be less than that of corresponding solutions of peroxide stored separately. In order to avoid the formation of undesirable oxidation products and also to maintain maximum antiseptic value, mixtures of this type when ordered for long periods should always be dispensed separately. Amber-tinted glass bottles should be used for dispensing the peroxide drops. Failing this, the patient should be instructed to keep the bottle in a cool and dark place. From the Pharmaceutical Department of St. Thomas's Hospital, London.

The Determination of Camphor in Galenicals

By C. H. HAMPSHIRE and G. R. PAGE

[ABSTRACT]

THE recognition of synthetic camphor by the British Pharmacopœia of 1932 has rendered inapplicable the determination of camphor by measurement of optical rotation as widely used previous thereto. The use of 2: 4-dinitrophenylhydrazone has been suggested, the derivative yielded with camphor being less volatile than the semicarbazide and phenylhydrazone. Precipitation

BRITISH PHARMACEUTICAL CONFERENCE 1934

is complete in three or four hours so that there is no need to apply a correction factor (for loss).

The procedure adopted was as follows:—

Reagent.—Ten mils of concentrated sulphuric acid is mixed with 10 mils of water and 1.5 gm. of 2: 4-dinitrophenylhydrazine is dissolved in the mixture. The solution is then diluted with water to 100 mils and filtered. The reagent decomposes on standing and must be made up just before using. *Method.*—About 0.2 gm. of camphor, accurately weighed by difference, is dissolved in 25 mils of aldehyde-free alcohol in a 300-mil conical flask and 75 mils of the reagent is slowly added with constant shaking. The mixture is then heated on a water bath under a reflux condenser for four hours, allowed to cool, diluted with 2-per-cent. sulphuric acid to 200 mils and allowed to stand for 24 hours. The precipitate is then collected on a weighed Gooch crucible with paper mat, washed with successive quantities of 10 mils of cold distilled water until the washings are no longer acid, and dried at 80° C.; 1 gm. of camphor 2:4-dinitrophenylhydrazone corresponds to 0.458 gm. of camphor.

Determinations were made on four specimens of camphor to test the accuracy of the method with the following results:—

	Experiment (1)	Experiment (2)	Melting point of dinitrophenylhydrazone (deg.C.)
	Per cent.	Per cent.	
(*a*) Natural resublimed camphor	98·33	98·28	174·5°
(*b*) Synthetic camphor	98·04	97·95	165°
(*c*) Pure (micro-reagent) camphor	99·10	99·22	175°
(*d*) Recrystallised camphor (m.p. 180° C.)	99·42	—	175°

Spirit of Camphor.—The method is applicable without modification, two mils of sample being diluted to 25 mils with aldehyde-free alcohol. Samples made to contain 10 per cent. w/v of (natural or synthetic) camphor assayed:—(*a*) Natural, 9.93 and 9.91 per cent. (w/v); (*b*) synthetic, 9.97 and 9.81 per cent. (w/v).

Galenicals.—Direct determination of camphor is not feasible in galenicals other than spirit of camphor, separation of camphor being necessary owing to possibility of the presence of interfering substances. Extraction with an immiscible solvent is impracticable but separation by steam distillation was found to be satisfactory. A quantity of galenical containing about 1 gm. of camphor is distilled in steam through a double surface condenser into an ice-cooled receiver. Any alcohol present distils over first and is followed by the camphor, which shows a tendency to deposit in the condenser (most marked with camphor liniment). Distillation is stopped when 150 mils has been collected and the condenser is washed with sufficient aldehyde-free alcohol to dissolve the camphor in the distillate. The volume of alcohol so used must be measured in order that the concentration of alcohol in the reaction mixture may be adjusted to 25 per cent. v/v. An aliquot part containing about 0.2 gm. of camphor is taken for assay. Tests showed that recovery of camphor is complete on distilling 150 mils. *Liniment of Aconite.*—This is made with industrial spirit containing aldehyde. Determinations on a percolate of aconite made with industrial methylated spirit and containing 3 per cent. of (natural or synthetic) camphor. Results were:—(*a*) Natural camphor, 3.02 per cent. (w/v); (*b*) synthetic camphor, 3.00 per cent. (w/v). A camphor-free control gave a precipitate with the reagent equivalent to 0.12 per cent. (w/v) of camphor. An attempt to retain aldehydes by making alkaline with sodium hydroxide was impracticable owing to excessive frothing. *Liniment of Belladonna.*—A percolate made with industrial methylated spirit and 5 per cent. of added camphor. Steam distillation gave the following results:—(*a*) Natural camphor, 4.92 and 4.94 per cent. (w/v); (*b*) synthetic camphor, 4.91 and 4.90 per cent. (w/v). A camphor-free control gave a precipitate equivalent to 0.09 per cent. (w/v) of camphor. *Liniment of Camphor.*—Two samples were made to contain 20 per cent. of (*a*) natural and (*b*) synthetic camphor. Determinations were made upon about 5 gm. of liniment, steam distillation being continued until 120 mils of distillate had been collected. The condenser was washed down with 100 mils of aldehyde-free alcohol and the product diluted to 250 mils. A splash bulb is necessary to prevent oil particles being carried over. 50 mils of diluted distillate was precipitated by the reagent. Results obtained were:—(*a*) Natural camphor, 19.66 per cent. (w/w); (*b*) synthetic camphor, 19.57 per cent. (w/w). A blank test on the olive oil showed negligible precipitation. B.P. assay showed (*a*) 19.98 and (*b*) 20.00 per cent. of camphor (w/w). *Ammoniated Liniment of Camphor.*—Samples were made with industrial methylated spirit containing 22.5 per cent. of camphor (w/v). 10 mils of the liniment, diluted with 10 mils of aldehyde-free alcohol, was acidified with sulphuric acid (with cooling in ice to avoid loss of camphor), prior to distillation with steam. Results were:—(*a*) Natural camphor, 12.39 and 12.44 per cent. (w/v); (*b*) synthetic camphor, 12.37 per cent. (w/v). The control gave a precipitate equivalent to 0.14 per cent. (w/v) of camphor.

The results indicate that the method using 2: 4-dinitrophenylhydrazine is applicable to the determination of camphor in galenicals. It is intended to repeat the experiments with a view to defining accuracy and for fixing correction figures for interfering substances, abnormal amounts of which are detected by reduction in melting point of the precipitated hydrazone. Publication is made with the object of inviting comment and criticism.

SUMMARY

Preliminary experiments show that the purity of camphor may be determined by the reaction with 2: 4-dinitrophenylhydrazine. Results of assays on galenicals indicate that it will be possible to formulate pharmacopœial requirements based on this method.

The Cardiac Activity and Toxicity towards Rats of Red and White Squill from Cyprus

By F. WOKES and S. G. WILLIMOTT

[ABSTRACT]

SQUILL bulb is indigenous in Cyprus, and samples sent to Kew in 1917 were provisionally identified as *Urginea scilla*. However, there is no sharp dividing line between red and white varieties, as all shades of pigmented bulb occur between faint pink and purple or dark red. It is doubtful whether true red squill grows naturally in Cyprus. The bulbs are onion shaped and vary considerably in size, ranging from 2 in. to 7 in. in diameter and 0.2 to 4 kilograms in weight. The overlapping fleshy scales are closely packed and have a decided irritant action on the skin. The specimens were collected during the dormant (summer) period, when physiological activity might be expected to be at its lowest. The thick fleshy leaves were cut into tiny pieces with a saw-edged knife and dried quickly in an electric oven at 90° C. to 100° C., the moisture lost amounting to between 85 and 88 per cent. The final product contained not more than 3 or 4 per cent. of moisture compared with 3 to 14 per cent. in commercial samples of dried squill. The drying did not discolour the brittle residue.

Assays by cat method of tinctures made from fresh and dried material indicate a loss of about 12 per cent. of activity (as scillaren) during drying, but the difference is not large enough to be significant. Data obtained upon tinctures also failed to reveal any significant difference in the processes employed in their preparation. Dried white Cyprus squill, assayed on cats for cardiac activity, showed an activity equivalent to 0.15 per cent. of scillaren. The average activity of sixty-five commercial tinctures examined in the Pharmacological Laboratory of the Pharmaceutical Society during the years 1928 to 1932 was equivalent to 0.232 gm. scillaren per 100 gm. of total solids. The strength of squill tincture was 1 in 5, and the average activity of squill used in their preparation must have been also equivalent to 0.15 per cent. of scillaren. Assays of aqueous extracts (1 in 50) by the frog method gave the following activities (in percentage equivalents of scillaren):—Red cultivated

BRITISH PHARMACEUTICAL CONFERENCE 1934

squill, 0.19 ; red wild squill, 0.18 ; and white squill, 0.20. Thus red and white Cyprus squill possess similar potency towards frogs. The oral toxicity of squill towards rats has been previously determined by administration in admixture with food, which does not ensure that the animal consumes the whole of the dose. In the present investigation the method described by Burn of giving as liquid by stomach tube has been adopted. Weighed quantities of the different squill powders were triturated carefully in water so as to form a uniform suspension, of which doses ranging from 2 to 6 mils. per 100 gm. body weight were given by stomach tube to female albino rats (inbred Wistar strain) which had been deprived of food overnight. These rats were fed on the following diet:—yellow corn 54, whole wheat 16.7, casein 7.5, dried yeast 4.2, sodium chloride 0.42, calcium carbonate 0.42. They were kept under observation for the development of symptoms characteristic of squill poisoning, which usually appeared within twenty-four hours, death ensuing within two or three days. Table I gives the mortalities produced by different doses of the squill powders, also the calculated average lethal dose, i.e., that which would produce 50 per cent. mortality). The figure for the white squill is less accurate because this material had to be fed mixed with the food, on account of the large doses required, and consumption records made to determine the amount actually consumed by each rat.

Table I

Toxicity towards Rats of Powders prepared from different varieties of Squill from Cyprus

Variety	Dose (gm. per kgm.)	Mortality	Estimated dose producing 50 per cent. mortality (gm. per kgm.)
Red cultivated ...	0·67	1 in 10	
Red cultivated ...	1·0	5 in 10	1·0
Red wild	0·67	0 in 6	
Red wild	1·0	1 in 10	1·5
Red wild	2·0	9 in 11	
White	8	2 in 10	10–15

Table II

Relative Potencies of Different Varieties of Cyprus Squill

Variety	Potency measured by	
	Cardiac glucosides	Toxicity towards rats
Red cultivated	95	100
Red wild	90	66
White	100	7–10

If the average lethal doses are employed for direct comparison of the toxicity of different samples, the powder prepared from the red squill cultivated in the Agricultural Gardens at Nicosia appears to be about one and a half times that of the powder prepared from the red squills growing wild in Cyprus, and from 10 to 15 times as toxic as the powder prepared from the white Cyprus squill. The above results are in substantial agreement with previous work on red and white squills from other sources. However, the number of animals employed was not sufficient to establish the figures with certainty. The red cultivated squill was certainly several times as toxic as the white squill and probably slightly more toxic than the red wild squill.

Summary

Dried powders prepared from red and white squill growing wild in Cyprus, and from red squill cultivated in the Agricultural Gardens at Nicosia gave the toxicities towards female albino rats summarised in Table II. All three varieties possessed similar cardiac activity, but the red cultivated squill is probably about one and a half times as toxic to rats as the red wild squill, and from 10 to 15 times as toxic as the white squill. The dried white squill was also assayed for cardiac glycosides by the cat method. This showed an activity equivalent to 0.22 per cent. of scillaren, which is similar in potency to average samples of squill, as determined by assays on a series of sixty-five commercial tinctures.

The Chairman, in declaring the proceedings of the Section closed, thanked the authors of all the papers, and the Pharmaceutical Society for the "red books" supplied.

New Books

Mellor, J. W.—*Uncle Joe's Nonsense.* 9½ in. by 7¼ in. Pp. 231. 12s. 6d. Longmans, Green & Co., Ltd., 39 Paternoster Row, London, E.C.4. [Described on the title-page as "a medley of fun and philosophy." Dr. Mellor is the well-known author of a series of chemical text-books.]

Gregg, S. J.—*The Adsorption of Gases by Solids.* 6¾ in. by 4¼ in. Pp. 120. 2s. 6d. Methuen & Co., Ltd., 36 Essex Street, London, W.C.2. [The nine chapters deal respectively with general characteristics ; experimental methods ; heat of adsorption ; theories ; forces ; the adsorbed layer ; structure of the adsorbed surface—active centres ; activated adsorption ; chemisorption. The bibliography is a full one.]

Richter, V. von.—*Organic Chemistry.* Vol. I (Chemistry of the Aliphatic Series). 3rd edition. 8¾ in. by 5¾ in. Pp. 790. 35s. Kegan Paul, Trench, Trubner & Co., Ltd., 68-74 Carter Lane, London, E.C.4. [The first English edition was published in 1915. The present edition has been translated from the twelfth German edition by Dr. E. N. Allott. After ninety introductory pages the book deals with Hydrocarbons ; Halogen Derivatives of Hydrocarbons ; Alcohols and their Oxidation Products (six sections); Carbohydrates ; Substances of Physiological Importance of Partially Known Constitution. The scope of this well-known classic may be indicated by the fact that the index extends to thirty-two pages, each containing two columns in small type. English usage has been followed in nomenclature where it differs from German usage.]

Britton, H. T. S.—*Conductometric Analysis.* 8½ in. by 5½ in. Pp. 178. 12s. 6d. Chapman & Hall, Ltd., 11 Henrietta Street, London, W.C.2. [The eighth volume of a series of monographs on applied chemistry edited by Dr. E. H. Tripp. The final chapter of the book is devoted to industrial applications of conductometric analysis.]

Macdonald, D.M.—*The Students' Pocket Prescriber and Guide to Prescription Writing.* 10th edition. 4¼ in. by 2¾ in. Pp. 263. 3s. E. & S. Livingstone, 16 and 17 Teviot Place, Edinburgh. [The first edition of this manual appeared in 1882, and the ninth in 1925. The present edition contains a selection of N.H.I. formulas, average weights of healthy persons, amplified diet lists and other additions. In consequence of the publication of the 1932 B.P. the revision has been thorough. Most of the prescriptions are given in full Latin.

Campbell, D.—*Handbook of Therapeutics.* Second edition. 7¼ in. by 4¾ in. Pp. 444. 12s. 6d. E. & S. Livingstone, 16-17 Teviot Place, Edinburgh. [The value of a manual of this type (as we pointed out on the appearance of the first edition of Dr. Campbell's book) is not confined to the purposes of medical students, but extends to pharmacists who wish to know something of the therapeutic effects of medicines. The present edition is the result of extensive revision: the author instances in his preface infant-feeding, diseases of the blood, lobar pneumonia, diseases of the parathyroid glands and other features, including several additions.]

BRITISH PHARMACEUTICAL CONFERENCE

The Social Side

The number of packages which the Conference visitor receives with his book of tickets and badge appears to increase in bulk as the years go on. This year three huge envelopes were presented to each Conferencer when he or she called at the Bureau. These, on examination, were found to contain (1) a 152-page booklet "Leeds, 1934" (giving details of the Conference programme and all about Leeds and district), two illustrated accounts of the excursions, and the badge; (2) a handsomely bound letter block (presented with the compliments of Goodall, Backhouse & Co., Ltd.); (3) a beautifully illustrated history of the House of Hirst, Brooke & Hirst, Ltd., from 1821 to 1932, a detailed description of the special exhibition at the Sheepscar factory (featuring a *C. & D.* front cover) and particulars of the specially organised transport service from the hotel to the works; (4) half-a-dozen packets of Brummel's Bath Foam.

* * * *

Tuesday evening's reception by Sir James and Lady Baillie in the Great Hall of the University, of which Sir James is Vice-Chancellor, was a brilliant success. Conference members had already savoured the atmosphere of the superb hall at the opening session in the morning, now they saw it under the softened glow of subdued lighting, with the polished floor cleared for dancing. Several local members of the University were present, in addition to a representative gathering of pharmacists, but, in contrast to the civic reception of the previous evening, academic robes were not worn—for which some of those entitled to wear them were thankful. Dancing commenced at an early hour, and continued till midnight, when another pleasant Conference memory was added to those that had been inscribed on the tablets.

* * * *

Among the large number of visitors who attended the conference none enjoyed themselves more than our confrère from New Zealand and his charming wife. They are in this country until about October, and are already steeped in the historical associations of what they call "Home." To them, as to all visitors in perhaps a lesser degree, the visit to Fountains Abbey was especially interesting. The ladies (and their stewards) were enthusiastic about what is generally regarded as the most beautiful monastic ruin in this country, if not in Europe. Not only the building itself, but the setting seemed to impress, and the weather continued kind. The arrangements made by the Local Committee for tea and refreshments were particularly extolled, and the general efficiency of the stewards commended on all hands.

GROUPS PHOTOGRAPHED AT FOUNTAINS ABBEY

BRITISH PHARMACEUTICAL CONFERENCE 1934

The Leeds Committee, as is the way of all well-organised Conference Local Executives, comprised several associated committees, the names and *personnel* of which have been recorded in the *C. & D.* This paragraph is a brief tribute to their efficiency and friendliness. They

After the Opening Ceremony

were continually in evidence at the Conference headquarters, advising members and visitors of the easiest way to get to the various meetings or functions (often by specially chartered motor coaches) and helping in many unexpected and very welcome ways. At the University and other venues they also acted as guides, saving the time of strangers in finding their destinations and advising as to the easiest way of return. Without them the Conference could not have functioned with any degree of comfort, and to their prolonged and unselfish labours, with Mr. J. H. Gough as chairman, the success of the Conference is mainly due. Grateful memories will follow them in the hearts of hundreds of pharmacists from all parts of the British Isles.

* * * *

Those twin stars the chairman and the president shone no less conspicuously than last year. We were again impressed by Dr. Hampshire's grasp of the subjects presented, not only in his opening address from the chair, but also in presiding over the Science Section—a severer test. And his willingness to allow discussion without

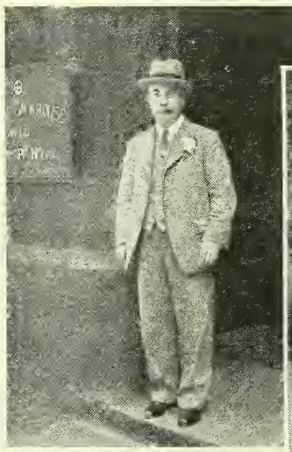
Mr. W. S. Culbert (Airdrie) and Mr. J. Lancaster (Leeds)

keeping the section in leading-strings was the outward and visible sign of a generous conception of his office. We were not able (for obvious reasons) to attend either of the delegates' meetings, but we understand that Mr. Keall acquitted himself with his usual geniality and diplomacy.

Many visitors availed themselves of the courteous invitations extended by Goodall, Backhouse & Co., Ltd., and Hirst, Brooke & Hirst, Ltd., to make personal inspection of their premises. Both have been so fully described and illustrated recently in the *C. & D.* that nothing can be added in the way of description; but the value of the personal touch is incalculable, and hundreds of chemists have come away somewhat astonished at the completeness of the facilities possessed by the Leeds houses for the supply of every type of chemists' merchandise in the most modern and attractive packings. Moreover the courtesies personally proferred by Mr. Bowman and his son, and by Mr. Geoffrey Hirst, Mr. Read, and their staff leave memories not easily eradicated.

* * * *

A pleasant half-hour was spent, after the proceedings of the Science Section closed on Wednesday, in visiting the laboratories and materia medica museum of the Medical School of the University. In the pharmacy department there was an exhibit showing the results obtained by Mr. A. W. Lupton, Ph.C., in his research on ipecacuanha. Demonstrations were given in the pharmacology department, where, perhaps, the visitors got



Mr. W. P. Bowman

and

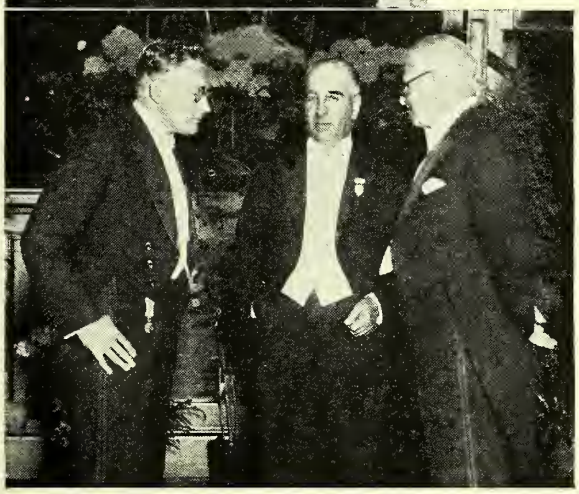
Mr. G. E. Bowman

their principal thrill. The sterilising and *x*-ray departments, the room for large-scale manufacture, the dark room and the kymograph room were seen in turn, and in each admiration of the modern and complete character of the equipment was expresed. For this act of courtesy (including tea in the library) sincere thanks are due to the Medical Faculty of the University.

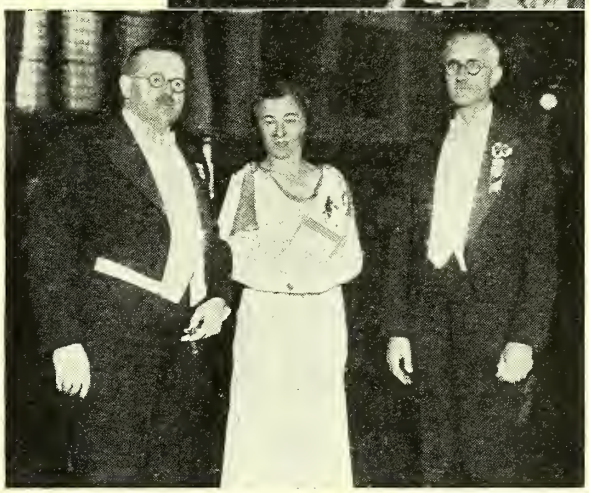
* * * *

The Conference banquet, held in Leeds Town Hall on July 18, was by common consent one of the most outstanding functions in a long series of enjoyable social events. The Town Hall, the home of the triennial musical festival, was almost unrecognisable with its festoons of Chinese lanterns; nevertheless the lighting and seating left nothing to be desired. The local committee must have worked on the heroic scale, as we understand that the Hall is not ideally suited to festivities of this kind. The list of names at the top table (reading from left to right) indicates the distinguished character of the visitors who were sufficiently interested in pharmacy to consent to be present. They were Mr. J. H. Everett (Leeds College of Technology), Mr. G. A. N. Hirst, Dr. J. J. Anning, Dr. Terry, Professor B. A. McSwiney, Professor Whitlaw Gray, Professor J. Kay Jamieson, Professor J. Le F. Burrow, Mr. E. Saville Peck, Mrs. Keal, Professor G. W. Watson, the

THE SCOTTISH CONTINGENT



Left to right: MR. A MORTIMER, MR G. A. MALLINSON, MR J. H. FRANKLIN



MR. & MRS. J. F. SIMON and MR. HAROLD HAW

Reception by Sir James and Lady Baillie at the University

BRITISH PHARMACEUTICAL CONFERENCE 1934

Lady Mayoress, the president of the Pharmaceutical Society, the Lord Mayor of Leeds, the chairman and Mrs. Hampshire, Sir James Baillie, Judge Woodcock,

MESSRS. G. R. MILNE, G. RATTRAY, J. JUDGE and G. HIRST

Mrs. Gough, Sir Stanley Jackson, Mr. J. H. Gough, Professor Challenger, the Rev. E. W. Bridgwood, Dr. A. St. G. Huggett, Dr. J. J. Jervis, Mr. A. E. Wheeler, Mr. W. J. Bees, Mr. H. Richardson, Mr. C. H. Mauley, Mr. S. C. Fryer. The first of the four toasts was " The Pharmaceutical Society of Great Britain," proposed in a delightful speech by Judge Woodcock. His Honour remarked that pharmacists had to-day a light task compared with those of their progenitors who dried newts in ovens for various ailments. Pharmacists had power to poison but were generally acquitted of the charge of manslaughter. (Laughter.) He congratulated them on the position they now held, a position comparable to that of solicitors. It was rumoured that in addition to other universities Leeds was thinking of conferring a degree in pharmacy. The president of the Society briefly replied. The present, he said, was a period of reorganisation and pharmacists must take their part in the development of modern therapeutics. The toast of " The British Pharmaceutical Conference " was submitted by Professor Watson in a charmingly humorous speech. From his earliest days, he said, he had had a profound distrust of the chemist, and he gave some reminiscences of his childhood. He was one of the few physicians, he added, who retain a respect for the old-fashioned prescription. He was much impressed by the research going on in pharmacy and the efforts to supply pure drugs. The medicaments of the physician were rather forced upon him. (Laughter.) In effect the public were being made the subject of therapeutic experiment. The art of prescribing was in danger of being lost. The chairman, in a brief and sincere reply, expressed his thanks and his gratification at being chairman of the Conference in Leeds, a city bountiful in hospitality and endowed with a growing university. " The City and University of Leeds " was submitted by the Vice-President of the Pharmaceutical Society, who outlined the growth of the city. Replies were made by the Lord Mayor, who was racily humorous, and by the Vice-Chancellor, in more serious vein. The final toast, " The Guests," was proposed by Mr. J. H. Gough, who began by quoting " THE CHEMIST AND DRUGGIST." Mr. Gough's speech was one of the most successful of the evening and the briefest. The Rt. Hon. Sir Stanley Jackson replied in humorous vein. Vocal solos completed the programme and the company afterwards adjourned to the headquarters for dancing.

MRS STOREY and MESSRS. S. GIBSON, W. MORTON, D. L. KIRKPATRICK and F. STOREY

Recreations which bring Business

IN these days most people have a fair amount of time available for some form of recreation. An expanding business is being done in sports requisites, and although the chemist handles but a small proportion of it, there is still scope for many legitimate lines which, especially in the summer months, will help to counterbalance the depleted returns that inevitably follow winter's activities.

It is fairly certain that comparatively few motorists include in their equipment any first-aid requisites. For this reason a sensible outfit, contained in an enamelled tin case, is an ideal line to display, especially if its use and value is indicated on a show-card. The motoring enthusiast only needs to be reminded of the necessity of being prepared for minor accidents, and the chances are that he will realise the wisdom of such advice. A vacuum flask is another item which is not out of place in a car, and the average motorist will purchase a flask of moderately good quality rather than a cheap specimen. There is also opened up the possibility of such lines as cooling drinks, concentrated food tablets and thirst quenchers.

Those who play tennis may require wrist straps, anklets, elastic hose and crepe bandages. Sunburn lotion, preparations for treating and preventing gnat-bites, as well as embrocation to relieve stiffness after play, are all likely to be in demand. As picnics often accompany tennis parties, the chemist who stocks such lines as paper serviettes, tea sets in wood pulp and complete picnic sets should bring them into prominence.

Swimming calls for supplies from the pharmacy. Bathing caps, helmets and shoes are sold in tremendous quantities every summer, and the chemist who is in a position to make a striking display will reap good results. The best field for this type of business is, of course, the seaside.

Among the remaining recreations which might be explored for business purposes is cycling. The low-priced ambulance case should appeal. The same set may also be suggested to the " hiker," together with the various foot appliances and other aids to enjoyment of tramping. Bowls and cricket offer but little scope to the chemist, with the exception of the usual emergency dressings for minor mishaps. Getting into touch with club secretaries may bring business.

The importance of photography in its relation to summer sports cannot be over-stressed. Such slogans as " Take your camera to the tennis courts," and " Put the camera in the car " will act as reminders that the happy hours of sport and pastime may be recalled by snaps. Films and photographic sundries, therefore, will not be out of place if displayed along with lines connected with recreation. It may be well for the chemist himself to indulge in summer recreation as far as time, health and other circumstances will permit. The value of this physical and mental relaxation is obvious, whilst from a business point of view the chemist is brought into touch with other people. *A. S.* (5/5.)

Trade Report

Where possible scales of prices of chemicals are given for bulk down to small quantities. Prices recorded for crude drugs, essential and fixed oils and coal tar products are for fair sized wholesale quantities. Qualities of chemicals, drugs, essential and fixed oils, etc., vary, and selected brands or grades would be at higher values.

28 Essex Street, W.C.2, July 19

THE markets generally have had a distinctly better tone this week, and quite a fair amount of business has been transacted. The continued labour troubles in the United States have had a hardening effect on prices in several commodities, whilst the unusually prolonged drought in most countries has seriously curtailed production of several drugs and herbs. BUCHU continues firm, and holders are asking more money for the somewhat limited supplies. CASCARA SAGRADA remains steady, with an absence of first-hand offers. SENEGA continues at the recent lower levels. SENNA, fine Alexandrian hand-picked pods, are still scarce and wanted. Hand-picked Tinnevelly pods are dearer on account of short supplies, pending the arrival of the new crop. Japanese MENTHOL and PEPPERMINT OIL continue to display activity, and higher prices are being paid. COD-LIVER OIL is steady and unchanged. GUM ACACIA is much dearer for shipment, and stocks in the Sudan are well below normal requirements. TRAGACANTH is still firmly held, and the finest grades are still in short supply.

Exchange Rates on London

THE following is a list of the chief Continental and other exchauge rates at the opening on Thursday morning:—

Centre	Quoted	Par	July 19	Value of the £
Amsterdam	Fl. to £	12·107	7·43½	12/3½
Berlin	Mks. to £	20·43	13·08	13/9½
Brussels	Belgas to £	35	21·57	12/4
Copenhagen	Kr. to £	18·259	22·39½	24/8
Lisbon	Esc. to £	110	109⅝	19/11
Madrid	Ptas. to £	25·22½	36⅝	29/1½
Milan	Lire to £	92·46	58 23/32	12/8½
Montreal	Dol. to £	4·86⅔	4·98½	20/6½
New York	Dol. to £	nominal	5·03⅞	20/8⅝
Oslo	Kr. to £	18·159	19·90½	21/11
Paris	Fr. to £	124·21	76 11/32	12/8½
Prague	Kr. to £	164·25	121½	13/8½
Stockholm	Kr. to £	18·159	19·40	21/4⅜
Warsaw	Zloty to £	43·38	26¾	12/4¼
Zurich	Fr. to £	25·2215	15·46	12/4¼

Bank rate 2 per cent.

Pharmaceutical Chemicals, etc.

BUSINESS has been on about the usual scale, with prices generally unchanged on quotation.

ACETANILID.—Rather more inquiry; market steady: B.P. crystals and powder, 1s. 5½d. to 1s. 8d. per lb., as to quantity.

AMIDOL.—Seasonal business is moving well; values steady: 56 lb., 7s. 3d.; 28 lb., 7s. 6d.; 14 lb., 7s. 11d. per lb., in 7-lb. tins. Wholesale distributors' prices for smaller quantities would be dearer.

AMMONIUM ICHTHOSULPHONATE.—Very steady; fair demand: one cwt., 1s. 6¾d., in 14-lb. tins; 1s. 8d., in 1-lb. tins; 1s. 11d., in 8-oz. tins; and 2s. 1d. per lb., in 4-oz. tins.

AMIDOPYRIN.—The market is rather dull with some cheap offers noted: crystals, five cwt., 18s. 9d.; two cwt., 19s. 1¼d.; less than two cwt., 19s. 6d. per lb.; with powder, 2¼d. per lb. extra.

ASPIRIN.—Market steady; business about average: home trade, ten cwt., 2s. 7d.; five cwt., 2s. 8d.; one cwt,. 2s. 8½d.; 28 lb., 2s. 9d.; 14 lb., 2s. 10d.; 7 lb., 3s.; 4 lb., 3s. 2d.; 1 lb., 3s. 4d. per lb. Bulk packing free, net, carriage paid. Contracts: Over twelve months, minimum, one ton; over six months, less than one ton.

ASPIRIN (TABLETS).—Tablet makers' scale of wholesale prices, as follows:—Under 5,000 tablets, 3s. per 1,000; 5,000, 2s. 11d.; 10,000, 2s. 10d.; 25,000, 2s. 9d.; 50,000, 2s. 8d.; 75,000, 2s. 7d.; 100,000, 2s. 6d.; 250,000, 2s. 5d.; 500,000, 2s. 4d.; 1,000,000, 2s. 3d.; over 1,000,000, 2s. 2d. per thousand tablets. For over one million a rebate of 1d. per 1,000 on 10 million tablets over 12 months. Wholesale distributors' prices for smaller quantities would be dearer.

BARBITONE.—New official prices are as follows: One or two cwt., 14s. 1½d.; 56 lb., 14s. 6d.; smaller quantities, 14s. 10½d., per lb., ex warehouse, London, duty paid.

BENZOIC ACID (B.P.).—Quite a fair business at former figures: quantities, ex works, 1s. 9½d.; spot parcels, 1s. 10d. to 2s. 2d. per lb., ex store, as to quantity.

BISMUTH SALTS.—Makers' scale of prices for these salts are fully steady.

BROMIDES.—Makers' and dealers' quoted prices steady; business fair: ammonium, not less than five cwt., 1s. 9d.; one cwt., 1s. 10d.; 28 lb., 2s. 1d.; smaller quantities, 2s. 5d. per lb.; potassium B.P. crystals and granular, not less than five cwt., 1s. 6d.; one cwt., 1s. 7d.; 28 lb., 1s. 10d.; smaller quantities, 2s. 2d. per lb.; sodium B.P., not less than five cwt., 1s. 8d.; one cwt., 1s. 9d.; 28 lb., 2s.; smaller quantities, 2s. 4d. per lb., without engagement. Special prices for larger quantities.

CAFFEINE.—British-made material is quoted at the advance reported last week: one cwt., 7s. 6d.; 56 lb., 7s. 9d.; smaller quantities, 8s. Citrate, one cwt., 4s. 6d.; 56 lb., 4s. 9d.; smaller quantities, 5s. per lb. Dealers' prices for Continental material to come forward are unchanged, as follows: 250 lb., 6s. 6½d.; 100 lb., 6s. 8½d.; 50 lb., 6s. 11d.; less than 50 lb., 7s. 1d. per lb. Citrate, 250 lb., 5s. 5d.; 100 lb., 5s. 5¾d.; 50 lb., 5s. 7d.; less than 50 lb., 5s. 8½d. per lb., net, carriage paid on minimum 50-lb. lots. Packages from 5 lb. and upwards free.

CALCIUM LACTATE.—Prices quoted are steadier: spot, one cwt., 1s. 0½d.; 56 lb., 1s. 1½d.; 28 lb., 1s. 2½d.; smaller quantities, up to 1s. 6d. per lb.

CHLORAL HYDRATE.—British material commands the market: duty-paid crystals, in 14-lb. free containers, five cwt., 3s. 1d.; one cwt., 3s. 2d.; 28 lb., 3s. 3d.; 14 lb., 3s. 4½d. per lb.; 28-lb. jars, one penny per lb. extra.

CITRIC ACID (B.P. CRYSTALS).—A substantial business continues with British makers quoting at 9d. per lb., less 5 per cent. discount, nominal and without engagement. Dealers are offering foreign material at very keen prices.

CREAM OF TARTAR.—Business continues on a good scale, with British 99 to 100 per cent. quoted at 82s. per cwt., less 2½ per cent. discount, nominal and without engagement. Dealers are quoting foreign material at competitive prices.

DEXTROSE, B.P.—Makers' prices are as follows:—

Quantity	Per lb.
	s. d.
1 lb. and under 7 lb.	1 1½
7 lb. and under 28 lb.	1 0
28 lb. and under 1 cwt.	0 10½
1 cwt. and under 2½ cwt.	0 9½
2½ cwt. and over	0 9

Net, carriage-paid terms. Discounts to wholesalers. Sales are made on condition that re-sale, both bulk and packages, is made only at the retail and wholesale re-sale terms.

ETHER (METHYLATED).—Makers' prices are as follows: s.g. 0.750, 1s. 1½d.; 0.735, 1s. 2d.; 0.730, 1s. 2d.; 0.725, 1s. 4d. per lb., in w-quarts; 12 w-quarts, halfpenny less and packed in drums or carboys 1d. less.

FERRI-QUININE CITRATE.—Makers' prices are as follows:—

Packing	100 oz. Per oz.	Less than 100 oz. Per oz.	Packing	100 oz. Per oz.	Less than 100 oz. Per oz.
100-oz. tins	10½d.	—	8- & 4-oz. bottles	11¼d.	11⅜d.
25-oz. tins	10⅝d.	11d.	1-oz. bottles	1/0½	1/1
16-oz. bottles	11d.	11½d.	½-oz. bottles	1/3½	1/4

Special prices for larger quantities.

GUAIACOL CARBONATE.—A modest business on a keen market. Convention figures are: two cwt., 9s. 10¼d.; one cwt., 10s. 0½d.; less than one cwt., 10s. 2¾d. per lb.

HEXAMINE.—British material meets with a fair business; some imported material on the market: free-running crystals, five cwt., 1s. 8d.; two cwt., 1s. 8½d.; one cwt., 1s. 9d.; 14 lb., 1s. 11d.; smaller parcels, up to 2s. per lb.; powder, 1s. 5d. per lb. for cwt. lots and less for bulk quantities.

HYDROQUINONE.—Inquiry continues on a good scale at the former figures for one delivery and for contracts.

IODIDES.—Market has been quiet ; makers' prices for these salts are about unchanged.

LACTIC ACID (B.P.).—Fair business, with keen prices quoted for bulk quantities: quantities in carboys, 1s. 4¾d. to 1s. 5½d.; in winchesters and bottles, 1s. 6d. to 1s. 10d. per lb., as to quantity.

MERCURIALS.—Makers' prices for these salts are so far unchanged despite the recent advances in metal prices. Market is firm.

METHYL SALICYLATE (B.P.).—A limited inquiry, with makers' quoted prices about steady: ten cwt., 1s. 5d.; five cwt., 1s. 5¼d.; one cwt., 1s. 6d.; less than one cwt., 1s. 7d.; small quantities in bottles, up to 2s. per lb.

METHYL SULPHONAL.—Dealers are doing occasional business at steady sterling prices: two cwt., 17s. 6d.; one cwt., 17s. 11d.; 56 lb., 18s. 4d.; small parcels, 19s. 3d. per lb.

METOL.—Rather more inquiry with the market quite steady: 28 lb., 9s. 6d.; 14 lb., 9s. 9d. per lb., carriage paid. Wholesale distributors' prices for smaller quantities would be dearer.

PARAFORMALDEHYDE.—A steady business is reported: 100 per cent. powder, quantities in kegs, 1s. 2¾d. to 1s. 3d.; smaller parcels, up to 1s. 6d. per lb.

PHENACETIN.—A fair volume of inquiry with prices very keen: crystals or powder, five cwt., 3s. 4½d.; two cwt., 3s. 6d.; one cwt., 3s. 7½d.; 56 lb., 3s. 8d.; smaller parcels, up to 4s. 3d. per lb.

PHENAZONE.—Spot market is now fairly steady, with not much material offering under the scale: crystals, five cwt., 10s. 7¾d.; two cwt., 10s. 10d.; and less, up to 11s. 6d. per lb.; with powder, 2½d. per lb. extra.

PHENOLPHTHALEIN.—British material is being quoted at former figures: two cwt., 2s. 9d.; one cwt., 2s. 10d.; 28 lb., 3s.; 14 lb., 3s. 1d.; 7 lb., 3s. 2d.; smaller parcels, up to 3s. 6d. per lb.

PHENYL ETHYL BARBITURIC.—Business has been sustained, with prices holding at about 28s. 6d. to 30s. per lb., in 2-lb. bottles.

PYROGALLIC ACID.—The demand for limited quantities continues ; market steady: 56 lb., 7s. 9d.; 28 lb., 8s.; 14 lb., 8s. 6d.; 7 lb., 9s. 3d. per lb., in 7-lb. tins. Wholesale distributors' prices for smaller quantities would be dearer.

QUININE SALTS.—Sulphate, 2s.; bisulphate, 2s.; ethyl carbonate, 2s. 7½d.; salicylate, 2s. 8d.; phosphate, 3s. 1d.; hydrochloride, 2s. 6¼d.; bihydrochloride, 2s. 9½d.; hydrobromide, 2s. 6¼d.; bihydrobromide, 2s. 9½d.; valerianate 3s. 5¼d.; hypophosphite, 3s. 8¾d.; alkaloid, 2s. 9¾d. per oz., carriage paid on bulk quantities.

RESORCIN.—Prices for British material are steady: crystals, one cwt., 4s. 11d.; 56 lb., 5s.; 28 lb., 5s. 1d.; 14 lb., 5s. 3d.; 7 lb., 5s. 6d.; less than 7 lb., 6s. per lb.

SALICYLIC ACID (B.P.).—Market is steady, with some inquiry ; five cwt., 1s. 7d.; one cwt., 1s. 7½d.; 28 lb., 1s. 8d.; 14 lb., 1s. 9d.; 7 lb., 1s. 11d.; 4 lb., 2s. 1d. per lb.

SALOL.—Market is dull: spot, crystals, two cwt., 3s. 10d.; one cwt., 3s. 11½d.; 56 lb., 4s.; smaller parcels, up to 4s. 3d. per lb.; powder, 2d. per lb. extra.

SANTONIN.—Business continues slow with spot offers at not more than £10 per kilo.

SODIUM BENZOATE (B.P.).—Business continues on a good scale at competitive prices; spot, one cwt., 1s. 7d. and less for bulk lots ; smaller parcels, up to 1s. 11d. per lb.

SODIUM DIETHYLBARBITURATE.—Market is steady but rather quiet: spot, one cwt., 13s.; 56 lb., 13s. 3d.; 28 lb., 13s. 6d.; 14 lb., 13s. 9d.; 7 lb., 14s.; smaller parcels up to 15s. per lb.

SODIUM SALICYLATE (B.P.).—The scale of prices is steady ; some inquiry: home trade, powder or crystals, five cwt., 1s. 8½d.; one cwt., 1s. 9d.; 28 lb., 2s.; 14 lb., 2s. 2d.; 7 lb., 2s. 3d.; 1 lb., 2s. 6d. per lb.

SULPHONAL.—Dealers' sterling prices are steady: crystals or powder, two cwt., 14s.; one cwt., 14s. 5d.; 56 lb., 14s. 7d.; smaller parcels, up to 15s. per lb.

TARTARIC ACID (B.P. CRYSTALS).—Business continues on a good scale. British material quoted at 1s. 0½d. per lb., less 5 per cent. discount, nominal and without engagement. Dealers are offering foreign material at keen prices.

THYMOL.—The new Convention prices for British and foreign are as follows: synthetic, fine white, two cwt., 5s. 7d.; one cwt., 5s. 9d.; 56 lb., 5s. 11¼d.; 28 lb., 6s. 3¼d.; less, 7s. per lb.; ex ajowan seed, one cwt., 8s. 3d.; 56 lb., 8s. 6d.; 28 lb., 9s.; 14 lb., 10s. per lb.

VANILLIN.—The market is steadier at the revised scale published last week: ex guaiacol or clove oil, five cwt., 13s. 3d.; one cwt., 13s. 6d.; 56 lb., 13s. 9d.; less, 14s. per lb.

Crude Drugs, etc.

A REPORT of the Drug Auction will be found at the end of the Trade Report.

AGAR.—Shipment market is quite steady ; spot market unchanged. Spot, Kobe No. 1, 1s. 11d.; No. 2, 1s. 9½d.; Yokohama No. 1, 1s. 9d. per lb.; shipment, Kobe No. 1, 1s. 8d.; No. 2, 1s. 7d.; Yokohama No. 1, 1s. 6¾d. per lb., c.i.f.

CAMPHOR.—Market is quiet and unchanged: spot, slabs, 2s. 0½d.; flowers, 2s. 1d.; tablets, 2s. 4½d. per lb.; shipment, slabs, 1s. 9¼d.; flowers, 1s. 9½d.; tablets, 2s. 1d. per lb., c.i.f. English refined is still unchanged: flowers, one cwt., 3s. 1d.; 28 lb., 3s. 2d.; small lots, 3s. 3d. per lb. Transparent tablets, 4 oz., 8 oz. and 16 oz., 3s. 4d.; 1 oz. and 2 oz., 3s. 5d.; ½ oz., ⅓ oz. and ¼ oz., 3s. 6d. per lb.; special prices for contracts for quantities.

CASCARA SAGRADA.—Shipment market continues very firm, and there are no first-hand offers available from the coast. The position has been aggravated by the industrial troubles on the Pacific coast, and it is doubtful in any case whether offers could be made for shipment earlier than August/September. There are a few second-hand sellers around 36s. per cwt., c.i.f., but the quantities available are very small. Last season's peel is firmly held on the spot at from 43s. to 46s. per cwt., as to seller.

CHAMOMILES.—There are no supplies available at present, and the nominal quotation for good white flowers is 300s. per cwt. Prices of new crop flowers are expected shortly.

CLOVES.—Business still remains rather dull, and the market is unchanged. Zanzibar, spot, 5½d.; shipment, July/September, 5⅜d. per lb., c.i.f.

The landings of Zanzibar in London during the week ended July 14 were *nil* and the deliveries 137, leaving a stock of 4,488. From January 1 to date, landings of Zanzibar have been 3,762 and the deliveries 1,796⅝. Landings of Madagascar for the week ended July 7 were *nil*, and the deliveries *nil*, leaving a stock of 797. From January 1 to date, landings of Madagascar have been 282 and the deliveries 467 packages.

COCOA BUTTER.—Market is steady, with prime English quoted at 9½d. to 10½d. per lb., as to quantity.

COCOANUT (DESICCATED).—Prices are unchanged, with business rather slow. Spot, fine, 14s. 3d.; medium, 14s. 3d.; shipment, halves, August-September, 13s. 3d. per cwt., c.i.f.

COD-LIVER OIL.—The market continues quiet, but the tone remains quite steady, in spite of the seasonal lack of demand. Finest Norwegian non-freezing steam refined medicinal oil is quoted for shipment at about 90s. per barrel., c.i.f., London. Spot, in small lots, about 132s. per barrel, ex store. Newfoundland, finest non-freezing medicinal oil, 132s. 6d. per barrel, ex store. British oil, non-freezing finest medicinal, 125s. per barrel, c.i.f., London, duty free.

DANDELION ROOT.—Spot, 75s. per cwt.

DERRIS ROOT.—Stocks are practically exhausted, and it is reported that there is only one small lot available, with a very high test, viz., 25 per cent. ether extract, at 1s. 4d. per lb. Shipment offers are now more easily obtainable, at 10d. to 11d. per lb., on a 16 per cent. basis, Singapore test.

ERGOT.—Market is fully steady for shipment at 1s. 6d. per lb., c.i.f., for new crop Spanish, and 1s. 5d. per lb., c.i.f., for new crop Portuguese.

GELATIN.—The demand for this commodity continues steady, and prices are unchanged. German, gold leaf, 2s. 4d.; silver, 2s. 2d.; bronze leaf, 1s. 10d.; plain leaf, 1s. 8½d. per lb. French, gold leaf, 1s. 10d.; silver leaf, 1s. 8d.; bronze leaf, 1s. 6½d. per lb., in cwt. cases. British, No. 1, 80s.; No. 2, 70s. per cwt., in bags, carriage paid, less 2½ per cent. discount.

GENTIAN ROOT.—Continues quiet, and fair root is available on the spot at 50s. per cwt.

GINGER.—Market is fully steady, and West African on the spot is 20s.; for arrival the price is 26s. 6d. per cwt., c.i.f.

GUM ACACIA.—Is firmer in all positions, and it is reported that only 6,000 tons are available at origin, which figure is well below normal stocks. The shipment market continues very firm, and prices have sharply advanced. Kordofan cleaned sorts, 37s. per cwt., c.i.f., and 37s. 6d. per cwt., spot ; bleached, 67s. 6d. to 72s. 6d. per cwt., spot.

HYDRASTIS.—Is firmer to arrive, and the latest price from origin is 4s. 8d. per lb., c.i.f.

INSECT FLOWERS.—Market is firmly held, Dalmatian offering at 92s. 6d. to 95s., and Japanese, 95s. to 100s. per cwt., c.i.f.

LOBELIA HERB.—Has sharply advanced, and offers are at present difficult to obtain. Business has been done this week on the basis of 1s. per lb., c.i.f.

LYCOPODIUM.—Treble sifted is still offering in small lots, at about 2s. 8d. per kilo.

MENTHOL.—There has been more activity in this market, and with a fair amount of trade buying, prices have further advanced. K/S brands, spot, 10s. 6d.; in bond, 9s. 7½d.;

shipment, July-August, 9s. 10d.; October-December, 9s. 9d. per lb., c.i.f., from resellers. It is interesting to note that prices from Japan for shipment are 10s. to 10s. 3d. per lb., c.i.f.

MERCURY.—Prices are unchanged, spot offering at £11 9s. 6d. to £11 10s. 6d. per bottle, ex store.

PEPPER.—Market is rather quiet, although prices on balance are somewhat dearer. Lampong, spot, 4¼d.; shipment, August-October, 3 11/16d.; October-December, 3⅜d. per lb., c.i.f. Tellicherry, spot, 4¾d.; Aleppy, spot, 4⅝d. per lb. White Muntok, spot, 8¼d.; shipment, August-October, 7⅞d.; October-December, 7⅜d. per lb., c.i.f. Delivery, October, 8½d.; January, 9⅛d. per lb.

PIMENTO.—Prices are easier for shipment, July-August offering at 23s. 6d. per cwt., c.i.f. Spot is available at 3d. per lb.

QUILLAIA BARK.—Continues firm, with no c.i.f. offers available at present. Limited supplies are available on the spot of whole bark at 28s. per cwt., and crushed at 35s. per cwt.

RUBBER.—There has been a steady decline in all positions during the week, through lack of trade support, coupled with heavy arrivals. Standard ribbed smoked sheet, spot, July and August, 6 15/16d.; September, 7d.; October-December, 7⅛d.; January-March, 7¼d.; April-June, 7⅜d. per lb.

SAFFRON.—Business is being done at present on the basis of the following prices: Spot, prime B.P., 53s. 6d.; extra B.P., 50s.; super B.P., 49s. per lb. For bulk quantities these prices could be shaded.

SEEDS.—ANISE.—Spot, duty paid, Spanish, 67s. 6d.; Bulgarian, 46s. CARAWAY.—Dutch, market quiet and unchanged at 38s. quoted. CORIANDER.—Spot, Morocco 1933, crop sold at 17s. 9d., duty paid; new crop for shipment quoted at 11s. 6d., c.i.f., for August-September shipment. CUMIN.—Malta, now 60s., spot, and 47s. 6d., c.i.f., for shipment. No Morocco on spot; price for shipment, 45s., c.i.f. FENUGREEK.—Tunisian, 14s. 6d.; Morocco, 12s. 6d., duty paid. LINSEED.—English, 17s. 6d.; Dutch, 17s. MUSTARD.—English, 18s. to 29s. 6d., according to quality.

SENEGA.—The position remains unchanged, but the present low prices have attracted good business. Spot, 1s. 3½d.; shipment, 1s. 1¾d. to 1s. 2d. per lb., for fair quantities.

SENNA.—A few small lots of hand-picked Alexandrian pods have just arrived, but the colour and size shows a considerable falling off, and it is likely that each further shipment will tend to become more inferior. As the new crop cannot be expected before the early part of next year, it would appear that the position on the spot for really good pods will become very acute. A fair amount of buying has been going on, and practically all parcels of good to fair pods have changed hands and are now being held for much higher prices. Tinnevelly: There is a scarcity on the spot of best quality hand-picked pods, but with the new crop near at hand, the position should soon be relieved, although it is likely that prices will remain firm, in view of the higher forward quotations. Tinnevelly leaves remain unaltered, spot, 6d. per lb., for No. 1; 4d. for No. 2; and 3½d. for No. 3. Consignments of yellowish leaves are offered at slightly cheaper rates.

SHELLAC.—Is easier on the week, prices having declined 2s. to 3s. per cwt. Spot, standard TN orange, 100s. to 105s.; fine orange, 120s. to 140s.; pure button, 125s. per cwt. For delivery, TN, August, 102s.; October, 105s.; for arrival, TN, July-August, 102s. per cwt., c.i.f.

SQUILL.—New crop, best white, 25s. per cwt., to arrive.

STRAMONIUM LEAVES.—New crop Italian, 45s. per cwt., c.i.f.; Hungarian, 65s. per cwt., c.i.f.

TRAGACANTH.—There has been a steady call for the better grades of white, and in view of the absence of fresh arrivals, supplies of these qualities are very short. Gum between the values of £15 and £30, which represents the druggists' grades, are badly wanted. Business in the textile qualities, which for some time past was poor, is picking up.

VALERIAN ROOT.—Fair demand, and for fair spot root 55s. per cwt. is wanted.

WAX (VARIOUS).—BEES'.—Spot supplies are still short, and the market remains firm. Benguella, spot, 107s. 6d. per cwt.; shipment, 89s. per cwt., c.i.f. Abyssinian, spot, 110s.; shipment, 88s. per cwt., c.i.f. Dar-es-Salaam, spot, 110s.; shipment, 98s. per cwt., c.i.f. Madagascar, spot, 102s. 6d.; shipment, 82s. 6d. per cwt., c.i.f. Conakry, no spot supplies; shipment, 89s. per cwt., c.i.f. CARNAUBA, continues quite steady, with small offers from origin. Fatty grey, spot, 107s. 6d.; in bond, 98s.; afloat, 95s.; shipment, August-September, 95s. per cwt., c.i.f.; November-December shipments, 83s. per cwt., c.i.f. Chalky grey, spot, 100s.; in bond, 92s. 6d.; shipment, 80s. per cwt. c.i.f. Primeira, spot, 160s.; in bond, 145s.; shipment, 145s. per cwt., c.i.f. November-December shipment, 128s. per cwt., c.i.f.

Essential Oils, etc.

A FAIR number of products have been in good demand this week. Peppermint oils are again dearer and firm. Lemongrass and Cananga are short and dear on spot. Java and Ceylon Citronella remain dull and at cheap figures.

ANISE (STAR).—Spot market remains quiet, but the forward is somewhat steadier: spot, "Red Ship," in leads, 1s. 10½d.; in tins, 1s. 8½d.; in drums, 1s. 7½d.; shipment, in leads, 1s. 8¾d.; in tins, 1s. 7½d.; in drums, 1s. 7¼d. per lb., c.i.f.

BERGAMOT.—The shipment market has been very quiet and is easy in the region of 5s. 2d. to 5s. 3d. per lb., c.i.f., as to brand and quantity. Spot oil quoted at about 5s. 6d. to 5s. 9d. per lb.

BOIS DE ROSE.—The spot value of Brazilian is held at about 4s. 9d. to 5s. per lb.; shipment is quoted steadily at 4s. 6d. c.i.f.

CAJUPUT.—Market has been rather dull. Spot, 2s. to 2s. 3d.; green, 1s. 9½d. to 1s. 11d. per lb., as to quantity.

CANANGA.—Spot supplies are reported to be short and prices tending dearer at about 8s. 3d. to 8s. 6d. per lb. Shipment, about 7s. 9½d. per lb., c.i.f.

CARAWAY.—Occasional business; market steady. Dutch rectified, five cwt., 8s. 5d.; one cwt., 8s. 9d.; smaller quantities, up to 9s. 4d. per lb., ex store. Crude, 5d. per lb. less.

CASSIA.—Market still remains quiet. Spot, about 3s. 10d. per lb.; shipment, 3s. per lb., c.i.f., nominal.

CASSIA.—Spot continues steady at about 3s. 10½d. per lb. Shipment is nominal at 3s. per lb., c.i.f.

CEDARWOOD.—A moderate inquiry; market steady. American, spot, 1s. 4d.; shipment, 1s. 2d. per lb., c.i.f., in drums. African oil is offering at about level prices.

CINNAMON LEAF.—A little more inquiry, with Ceylon oil about 2s. 9d. to 3s. per lb., as to quantity, spot.

CITRONELLA.—Values in Java oil are depressed, with shipment about 1s. 3d. per lb., c.i.f., for quantities; spot, in small lots, about 1s. 6d. to 1s. 7d. per lb. Ceylon remains dull, with shipment about 1s. per lb., c.i.f., and spot about 1s. 3½d. per lb.

CLOVE.—A fair amount of small business is being done. English-made, B.P., 3s. 6d. to 3s. 10d. per lb., as to source and quantity. Madagascar spot, 3s. 4d. to 3s. 6d.; shipment, 2s. 4½d. per lb., c.i.f.

EUCALYPTUS.—The Empire oil is receiving some inquiry, prices are quite steady: 70 to 75 per cent., 11½d. to 1s.; 80 to 85 per cent., 1s. to 1s. 1d. per lb., landed. Spanish, 70 to 75 per cent., 1s. 2d. per lb., c.i.f.

LEMON.—Some moderate business has been done, but there has been no sustained demand. Sicilian hand-pressed, from 3s. 4d. to 3s. 8d. and higher, c.i.f., as to source. Spot oil has moved in small lots at about 3s. 6d. to 4s. per lb. Californian, in large drums, 1s. 10¾d.; in small drums, 1s. 11¼d. per lb., spot, with average business passing.

LEMONGRASS.—Spot supplies are reported to be very scarce, and now quoted nominally at 3s. 7d. to 3s. 8d. per lb. Shipment is holding at about 2s. 7½d. per lb., c.i.f.

LIME.—West Indian distilled has been in good demand on spot, with prices steady at 26s. to 27s. per lb. for small parcels.

PEPPERMINT.—A further upward movement in the Japanese oil has taken place, and prices all round are considerably dearer for all positions. Spot, sparingly offered at 4s.; shipment, July-August, 4s. 1½d.; October-December, 4s. 1d.; Japanese shippers are quoting 4s. 5d. to 4s. 6d. per lb., c.i.f., for the above positions. The American natural oil is again dearer, and quite a fair business has been done. On the spot the value is 14s. to 16s. per lb., according to brand.

Industrial Chemicals, etc.

THE markets generally are keeping steady and there is a fairly satisfactory volume of business being done. Acetone, formaldehyde and oxalic acid are good markets, and acetic acid continues to receive an increasing demand. Arsenic is still unsettled. ACETIC ACID is holding steady, with business continuing on a better scale: 80 per cent. technical, £38 5s.; 80 per cent. pure, £39 5s. per ton, in barrels; glacial, pharmaceutical, 99/100 per cent., £57, in glass demijohns; glacial, in barrels, £48 per ton, carriage paid in U.K. ACETONE, B.G.S., is steadily maintained, and there is quite a good demand: £65 to £68 per ton, in drums, carriage paid in U.K. AMMONIA (ANHYDROUS) is quoted unchanged, with a steady outlet for limited quantities: 90-95 per cent. material, 1s. to 1s. 2d. per lb., in loaned drums, carriage paid, and less for important contracts. AMMONIUM CHLORIDE.—Dealers' prices are steady and there is a fair volume of business moving: grey galvanising, £18 per ton, in casks, ex store; slightly less for contracts.

ARSENIC is still unsettled and very competitive ; quoted prices unchanged: Continental, £16 10s. per ton, c.i.f., London ; Japanese, £14 10s. per ton, c.i.f., London, for bulk quantities. BLEACHING POWDER is steady at home makers' prices, although there is some foreign competition: 35/37 per cent. chlorine, £8 12s. 6d. per ton, in softwood casks, carriage paid, for 4-ton lots. BORAX.—As last week. BORIC ACID.—As last week. FORMALDEHYDE is in active demand, with the market continuing keenly competitive: 40 per cent. by volume, £24 to £25 per ton, in casks, ex store ; slightly lower prices for big quantities. ISOPROPYL ALCOHOL is quoted unchanged by makers from £5 12s. per cwt., ex works, in drums. LEAD ACETATE.—British material is holding steady at recent levels ; business limited: brown, £31 7s. 6d.; white, £34 10s. per ton, in casks, delivered. LITHOPONE is unchanged on a steady market ; enquiry has been rather slow: Continental red seal, £17 10s. to £18 per ton, ex store. OXALIC ACID is firm and steady and there is a good active demand: bulk lots, £48 15s. per ton, in casks ; smaller quantities, 57s. to 58s. 6d. per cwt., in kegs, ex store. POTASH, CAUSTIC (88/92 PER CENT. SOLID).—Quoted prices are unchanged and steady ; a limited demand is reported: £35 5s. to £36 12s. 6d. per ton, in drums, ex store, as to quantity. POTASSIUM CARBONATE is meeting with a moderate enquiry: 90/92 per cent., £27 15s. per ton ; 96/98 per cent., £30 15s. per ton, in casks, ex store ; lower prices for contracts. POTASSIUM CHLORATE has continued rather dull ; prices unaltered: ton lots of powder or crystals, £36 10s.; smaller parcels, 4½d. to 5½d. per lb., ex store. POTASSIUM PERMANGANATE.—Dealers' prices are quite steady and there is a very fair business moving: commercial quality, in 2-cwt. drums, 8¾d. to 9¼d. per lb., ex store. POTASSIUM PRUSSIATE remains on the quiet side, but the market is steady at quoted: yellow, £74 10s. to £77 per ton, as to quantity, delivered. RED LEAD.—As last week. SAL AMMONIAC is steady but competitive ; a moderate demand is reported: dog-tooth crystals, £35 ; medium, £31 15s.; fine white crystals, £16 10s. per ton, in casks, ex store ; slightly less for contracts. SALTCAKE is being maintained, with business about average: 63s. 6d. per ton, in minimum truck lots, carriage paid. SODA, CAUSTIC.—As last week. SODA, CRYSTALS (CARBONATE).—As last week. SODIUM ACETATE has been a dull market, but is quoted unchanged: £21 10s. per ton, in casks, ex store. SODIUM BICARBONATE.—Makers' prices unchanged and steady: refined, in bags, £10 10s. per ton, carriage paid. CHLORATE is unchanged at recent rates ; enquiry restricted: ton lots, £32 10s.; smaller parcels, 4d. to 5d. per lb., ex store. SODIUM HYPOSULPHITE is in steady demand ; the market is well maintained: photographic pea crystals, £14 10s. per ton, in 1-cwt. kegs, carriage paid on minimum 2-ton lots ; commercial, £10 5s. per ton, in 2-cwt. bags for minimum 2-ton lots, carriage paid. SODIUM PRUSSIATE remains a rather dull market: quantities, 4¾d. per lb.; smaller parcels, 5d. to 6d. per lb., ex store. WHITE LEAD.—As last week.

London Drug Auction

Commercial Sale Rooms,
Mincing Lane, E.C.3.
July 19.

AT the Drug Auction held to-day only eight catalogues were submitted. The offerings covered the usual range of articles, and a good proportion represented fresh arrivals. The demand throughout was somewhat restricted, as is customary at this period of the year, but fair progress was made in certain directions. The feature of the auctions was the sharp advance in all grades of BUCHU, on account of the partial failure of the crop ; with the scarcity of spot supplies owners are very firm in their ideas, and prices will further advance unless fresh importations are available very shortly. RHUBARB was firmly held, and whilst a fair business is reported privately, there was little sold "under the hammer." DRAGONS BLOOD was in fair supply and withdrawn at steady prices. SENNA was quiet, with only small supplies on offer. IPECACUANHA: for the first time for many years nothing was catalogued, privately supplies are getting into smaller compass. BENZOIN, SUMATRA, very little offering, and prices firmly maintained. HONEY, a good range offered, but an absence of demand from the trade. CURAÇAO ALOES have been selling well and it is reported that practically all old stocks have been cleared. CARDAMOMS were in rather better demand and a fair portion sold.

ALOES.—Cape in small supply and three cases very ordinary quality retired at 36s. Curaçao: Sixty cases were catalogued, of which thirty-three cases were sold prior to auction, the remainder consisting chiefly of coarse dark, retired at 80s. "in bond." Zanzibar: Four cases at 65s. for liver in leaves and 70s. per cwt. for skins.

ANNATTO SEED.—Rather higher prices are being asked for spot parcels, and in auction twenty-four bags good Madras were limited and thirty-one bags Marmagoa at the same figure, the latter being "in bond."

BALSAM.—Tolu, in fair supply, and twenty cases offered of good pale softish and retired at 2s. 1d. per lb., duty paid. Peru: a parcel of five cases, without analysis, withdrawn at 4s. 8d. per lb. "in bond." Privately the market is very firm.

BENZOIN.—Without material alteration. Sumatra: good almondy seconds available £7 to £7 5s. Ordinary seconds at £6 5s. to £6 7s. 6d. per cwt. Siam: a fair selection offered ; fine bold almonds, of good bouquet, retired at £27 10s.; medium ditto, £25 ; small almonds £20 ; pea size £18 ; grains, £15 10s. per cwt., duty free.

BUCHU.—Considerably dearer, with a general advance all round on account of short supplies. In auction, nine bales of good green round were strictly limited at 1s. 3d., bids slightly under this figure being refused. Ovals: five bales of good bold green were in brisk demand and met with a ready sale at 9d. per lb.

CARDAMOMS.—Forty-two cases of Ceylon Mysore offered and about half sold at the following prices: medium bleached, 2s. 10d.; small, 2s. 2d.; very small splits, 1s. 6d. per lb.

CASCARILLA.—Seven bales were available, consisting of stringy quill retired at 2s. 3d. per lb.

COLOCYNTH.—Is very firm and orders recently sent to the Sudan have been refused as it is reported that stocks will not be available for shipment until the beginning of the new year. In auction: six cases whole apple retired at 10½d. per lb.

CUTTLE FISH BONE.—A small lot of good bold bone was disposed of prior to the auction.

DRAGONS BLOOD.—Continues to sell privately, and although a fair selection offered nothing was sold "under the hammer." Fine reboiled Singapore lump was held for £27 per cwt.; fair, £25 ; good pickings, £18 to £20, all "in bond."

ELEMI.—A very nice parcel of twenty-one cases, good No. 1 white gum, was offered at 47s. 6d. per cwt. "in bond."

GAMBOGE.—Only three cases offered, and these consisted of fine Siam pipe, and were withdrawn at £14 10s. per cwt., duty paid.

HONEY.—Jamaica: 277 packages were offered and bought in from 33s. to 45s. per cwt., according to quality. Mexican, twenty-eight casks, San Domingo, nine casks, Salvador, six casks, were also retired in the absence of bidding.

JALAP.—A total of twenty-three bags were offered and retired according to analysis at from 7d. to 1s. 5d. per lb.

MYRRH.—Twenty-three packages were withdrawn, good picked Aden at £7 5s. per cwt., duty free, fair Aden sorts, £5 10s., "in bond." Small and dusty ditto, 95s., rough pickings, 50s. per cwt., and two cases good peas were available at 70s. per cwt.

ORANGE PEEL.—In all, eleven cases were on offer, and fair thin cut Tripoli were retired at 1s. 3d. per lb., "in bond."

QUINCE SEED.—Nine bags of Cape were available and retired at from 3s. to 3s. 3d. per lb., at which price the auctioneer reported private sales.

RHUBARB.—Altogether sixty-one cases were catalogued, with the following prices: Shensi, bold round, 4s.; small and medium ditto, 3s. 7d. to 3s. 8d.; medium flat, 3s. 7d.; good pickings, 2s. 6d. per lb., duty paid. Canton: of different grades, 2s. 2d.; pickings, 1s. 6d. per lb., duty paid. High dried, flat, rather ordinary quality, 1s. 9d.; untrimmed horny flat, 1s. 6d.; rough round, 1s. 2d. to 1s. 4d. per lb., duty paid.

SARSAPARILLA.—Very little interest displayed and part sold, prior to auction ; for Jamaica, fair grey, 1s. 5d. per lb., "in bond" was realised. Native Jamaica, only dullish quality was available, for which 1s. to 1s. 1d. per lb. was asked. Mexican, ten bales of fair clean quality were held for 7½d. per lb., "in bond."

SCAMMONY ROOT.—A lot of twenty bags, testing 17.45 per cent., by Messrs. Harrison & Self's analysis, retired at 30s. per cwt., duty paid.

SENNA.—Only small lots on offer: Alexandrian, the offerings consisted entirely of pods, which were priced at from 3s. per lb. to 1s. 3d., and 4½d. per lb. for manufacturing grades. Tinnevelly, small fairly green retired at 2½d. and hand-picked darkish pods at 4d. to 4½d. per lb.

STROPHANTHUS SEED.—Eight bags of 100 per cent. Kombè were available at 4s. 7d. per lb.

TURMERIC.—259 bags were offered and withdrawn. Good Madras finger at 20s. and fair Cochin split bulbs at 15s. per cwt.

WAX.—The following parcels offered and retired: San Domingo at 90s. "in bond"; Dar-es-Salaam at 110s., duty free ; White Calcutta at 115s. per cwt.

The next Drug Auction will be held on September 20.

Correspondence

Letters should be written on one side of the paper only. Correspondents may adopt an assumed name, but must in all cases furnish their real name and address to the Editor

Our Birthright

SIR,—Lost: The qualification of a chemist and druggist for the sake of 31s. 6d. I thank you for your leading article in last week's *C. & D.* (p. 37), and I do wish every chemist would read it. I once heard a well-known writer say it was a sin to be poor. Evidently the Pharmaceutical Society are of the same opinion. However, that is not the point. You chemists have paid for and passed your examination. No one has a right to take it from you. Will every chemist send a post-card protesting against such unjust treatment? I ask one chemist in every town to canvass his neighbours to protest.

Yours faithfully,
J. W. COX.

Birmingham.

SIR,—Your leader on this subject (*C. & D.*, July 14, p. 37) suggests interesting possibilities. It should give us pause (as we say), and by us I mean the Pharmaceutical Society also. If it is true, as you allege (and I see no reason for doubt) that it is contrary to constitutional practice to violate the intention of a Royal Charter ; and if, furthermore, Section 2 of the Pharmacy Act, 1852, is not repealed by the new Act, the question arises whether the Courts would uphold the compulsory payment of an annual subscription for those not " keeping open shop." Sooner or later the legality of the enforced payment is certain to be tested in the Courts. Those of us who are opposed to such compulsion would do well to engineer a test case sooner rather than later. It is conceivable—indeed, it is a fifty-fifty chance—that we should win ; and even if we lost we should at least know quite definitely where we stood ; and, moreover, a fight on such an issue would certainly have a salutary effect on the Society and " learn them " not to interfere unduly in the future with our liberties or with what you denominate our birthright. Funds would have to be found to fight such an action, but the enthusiasm of the rank and file leaves the provision of such funds in no doubt. We look to you, Sir, for leadership in such a contingency. It may well be that the legality of the compulsory fees would break down if it were proved in court that they are only in part retention fees.—Yours faithfully,

STATIM (16/7).

An Incident Explained

SIR,—Respecting the recent tea-poisoning incident at our works as reported in your paper on June 30 (p. 718) we should be obliged if you would kindly give prominence to a correction of an erroneous and unauthorised statement recently appearing in the national Press. The city analyst has reported that he has found traces of an alkaloidal poison of the homatropine group in the tea. It was stated in several papers that homatropine ointment was being prepared at the same time as the tea was being made, and it was suggested that contamination of the tea had taken place because of this. We wish to repudiate this statement emphatically. Neither homatropine, atropine nor hyoscine was used in any shape or form on the day in question. Your publication of this correction would be greatly appreciated. We might add for the information of our many friends that all our staff have completely recovered and are once more back to business.—Yours faithfully,

HALL FORSTER & CO., LTD.,
J. H. FORSTER, Managing Director.

Newcastle-upon-Tyne.

Ordered but not Called For

SIR,—During a comparatively short experience as a proprietor, I have found that one definite source of loss is that resulting from goods which customers order specially and do not call for as promised. We have quite a large cupboard which contains an assortment of goods of this type. Some such losses seem inevitable. It is not encouraging, however, when we go to the trouble of ordering, and paying postage on, a single thing, to find that it remains on our hands. Another source of loss in this direction occurs when a customer promises to use a certain shaving soap, or safety razor blade, if we will stock it. We order a small quantity, but before the supply is exhausted, the fickle user has formed an affection for some other brand. The problem is to know what to do. The chemist might tell his customer outright that he does not stock So-and-So's pills, or he might promise to get them, and ask for a small deposit (or full payment) in advance. In either case, he would probably give offence. There is always the chance that some other customer may ask for one of these store-cupboard contents, but it is unlikely. The final note of annoyance is sounded when a stranger requests one of the left-over items, which is found, upon examination, to have deteriorated so much that it cannot honestly be sold.—Yours faithfully,

RETAILER (16/7).

Treatment of Sunburn

SIR,—In the article on " Sunburn " (*C. & D.*, June 30, p. 772) two formulas for calamine lotions and one including witch hazel are given. I have found a combination of these two to be very useful where the skin is red and inflamed with soreness and irritation, for example:—

Calamine	℥ij.
Zinc oxide	ʒj.
Glycerin	ʒj.
Witch hazel	ʒij.
Distilled water to	℥xx.

I should like to know what is considered the best treatment where the skin is raw. I saw one bad case where the chest and back were quite raw and weeping: the customer was under medical treatment and the doctor had applied a jacket of white lint soaked in olive oil, which was renewed at intervals. Is there any other method besides this? Also, I find that some customers when asking for a sunburn lotion require something to apply beforehand to prevent burning, others a preparation to cure the burns, while some want the same lotion for both purposes.—Yours faithfully,

BURNITIS (9/7).

"Redundant" Pharmacies

SIR,—Though some years retired, I take an interest in observing some of these new ventures, watching and hoping for their success. Our big cities have stretched out to such an extent that there must be room for newcomers. They may and do, no doubt, for a time have to be satisfied with small results. Was it not always like that? In my own first venture I lived on 10s. a week for about two years, and did not lose weight! But in these days bigger stocks (or rather, bigger assortments of goods) are essential. People still have a long way to walk to reach a pharmacy, and from place of residence to town may mean 4d. or 6d. for bus fare. Some side-lines are useful. The optical is, I think, somewhat overdone, unless the pharmacist has some assistance. One cannot rush an optical case, althongh the profit may be very good. In photography something may be done, and in books. I believe I was one of the first to suggest a "loan" library as part of the equipment of the suburban pharmacist, and I have seen it successfully adopted. One thing I am sure would help. Picture postcards have a certain life. Many of our suburbs have never been photographed, and some of the new roads, crescents and so on, are pretty enough. Many of the subnrban areas near me contain picturesque houses; and I have not seen a camera about the place for years. If I were a newcomer I would certainly have a try at this.—Yours, etc.,

EMERITUS (30/4).

Pharmaceutical Service

SIR,—Each year, in the weeks preceding the British Pharmaceutical Conference, you publish photographs of a number of representative pharmacies in the town in which the Conference is held, and it has often occurred to me that it would be instructive to know the total number of pharmacies and the population of the districts they serve. In the town in which I am in business the latest figures give a population of about 150,000, and to supply their pharmaceutical needs there are five branches of multiple chemists, two co-operative pharmacy departments, thirty individual proprietors, and half a dozen drug stores and herbalists, to say nothing of several cut price shops for chemists' goods, and the usual bazaars, grocers and oil shops which sell all kinds of packed drugs, patent medicines and toilet goods. But if we leave the latter out of consideration it means that roughly there is one establishment under qualified supervision to each 4,000 of the public; and as the census takes account of every individual probably nearly half of these are children. Estimating it as widely as possible, there will not be 3,000 potential customers for every single chemist. And it is not enough. The result, so far as the private chemist is concerned, is that perhaps a dozen or so of the older established ones in the busier shopping areas are doing moderately well and showing a profit, another dozen who were the first comers in the newer parts of the town may also gradually be building up a connection, while the rest or the mushroom growth of the last three or four years carry on for a time, then the business changes hands and the process is repeated. But the point is that none of them are doing really good business, and at least half of them could be closed without any deprivation to the public and to the great advantage of the more firmly established shops.

Faithfully yours,

POPULOUS (17/7).

Legal Queries

H. M. B. (24/10).—The use of the title "Family Doctor" would not itself render the article liable to medicine-stamp duty. However, care must be taken not to use it with such qualifying words as would create liability.

J. C. R. (10/11).—A package containing a mixture of powdered herbs recommended for the treatment of any ailment must bear a medicine stamp. The use of the word "constipation" in reference to the article is sufficient to create liability to medicine-stamp duty.

T. H. B. (12/12) engaged a lad "on trial" with a view to taking him as an apprentice, but at the end of ten days had to get rid of him because he was not suitable. The lad was paid "the usual pocket money" that he would have received as an apprentice. He now claims a week's money in lieu of notice. Is this demand enforceable? [Without knowing the exact terms of the lad's engagement it is impossible to express a definite opinion; but it would seem that there was some kind of contract of service. In that event, it is probable that the Court would uphold the lad's claim to a week's notice, or payment in lieu of notice, unless he was discharged upon some ground that justified instant dismissal.]

R. I. (24/1).—The business of a deceased person is being carried on in his name. Must the name of the present proprietor be disclosed on the outside of the premises, or on the business stationery? If the law in this respect is not complied with, can the manager of the shop be held responsible? [The business must be registered under the Registration of Business Names Act, 1916, and the name of the new proprietor must be disclosed on all business stationery on which the late owner's name appears. The new proprietor's name need not be shown on the outside of the premises. In our opinion, the manager would not be held legally responsible for not complying with the Act, but it is clearly his moral duty to draw the attention of his employer to the regulations.]

Miscellaneous Inquiries

When samples are sent particulars should be supplied to us as to their origin, what they are, what they are used for, and how. We do not undertake to analyse and report upon proprietary articles nor to publish supposed formulas for them.

G. P. (24/88).—EFFERVESCING MOUTH WASH TABLETS.—The following yields a highly satisfactory preparation which keeps well:—

A

Sodium bicarbonate	500 grs.
Borax	300 grs.
Boracic acid, powdered ...	50 grs.
Eosin	¾ gr.
Menthol	1 gr.
Thymol	1 gr.
Eucalyptol	♏5
Saccharin, soluble	1 gr.
Lemon oil	♏6

B

Tartaric acid	400 grs.
Lactose	300 grs.
Eosin	¾ gr.

Dry the powders separately, granulate carefully, taking care to ensure that the tint of the two tablets is the same. Then make into compressed tablets, using talc as the lubricant.

Allan S. (9/78).—GLEGG'S MIXTURE.—The following is the formula for Glegg's mixture as adopted by Dr. E. P. Poulton:—

Liquid paraffin	3 parts
Soft white paraffin	1 part

Flavoured slightly with rosettol.

Dr. Poulton also uses the same with an addition of ½ gr. menthol per ounce of mixture, without the rosettol.

W. F. (4/6).—ADHESIVE.—This preparation for closing down the lids of heavy cardboard boxes was found to be a solution of sodium silicate (not fluosilicate as suggested). The specific gravity is 1.38. This may be slightly diluted waterglass, but more probably it is a special solution of somewhat different character.

E. H. E. (15/98).—SPIRIT GUM.—The following is stated to be a good formula for this preparation:—

Mastic	5·5 parts
Ether, 0·720	5·5 parts
Rosin, pale	33·5 parts
Sandarac	11·0 parts
Alcohol	44·5 parts

Dissolve the mastic in the ether; the rosin and the sandarac in the alcohol. Mix the solutions, allow to stand and decant.

A cheaper formula is a solution of rosin in acetone with the addition of a little castor oil.

Retrospect of Fifty Years Ago

Reprinted from "The Chemist and Druggist," July 15, 1884

Health Exhibition

The second million of visitors are now being entertained at this delightful resort, and the chief features of the exhibition are by this time abundantly familiar to all the loungers of London. . . . Very interesting is the Anthropometric Laboratory arranged by Francis Galton, F.R.S. This is a space, 36 ft. long by 6 ft. wide, situated in the East Corridor Annexe and enclosed by a latticework fence. The visitor who wishes to be experimented on pays 3d., and enters at one end of this laboratory, where he is given a card on which he or she states age, condition, occupation, birthplace, and residence. The attendant then takes the card, and indicates sex and colour of eyes. Mr. Galton would like to get at the colour of the hair as well, but he has recognised the inherent difficulties of such an investigation in these days of pomades, dyes, and artificial substitutes for natural hair. The keenness of sight is then tested by means of diamond type; colour sense is ascertained by various coloured wools. The judgment of the eye is discovered by the visitor marking what he considers the centre of a piece of wood.

COMPLAINT

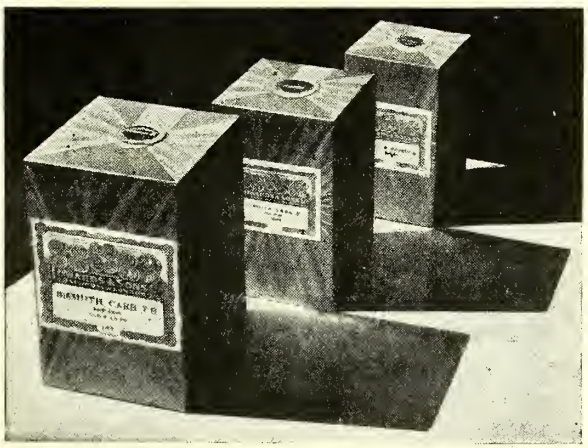
has been made on many occasions of the difficulty in obtaining uniformity in products containing Bismuth Carb. There is no doubt the Pharmacist has had a real grievance. He has probably ordered his Bismuth Carb. along with other goods, making no stipulation as to the maker; regarding a guarantee of B.P. as sufficient. The Wholesale House buys stocks of Bismuth possibly on the same lines and in all good faith from different sources from time to time. It is not therefore surprising that the Dispenser finds periodically fluctuations in the bulk of certain powders, tablets, etc., containing Bismuth Carb., whilst mixtures show even greater variations, when the Bismuth has "settled." To obviate these troubles Howards have standardized the density of their Bismuth Carbonate.

Pure Bismuth Carbonate of beautiful colour and appearance, guaranteed B.P. and at a price which competes with any other product, is now manufactured by Howards & Sons, Ltd., of Ilford, in the following STANDARD DENSITIES.

1-lb. of the Ordinary Bismuth Carb. occupies 32 fluid ounces.
1-lb. of "light" „ „ „ 50 „ „

In addition to this a special EXTRA LIGHT is made of the remarkable density of 1-lb. to 80 fluid ounces, though this costs 3d. more per pound owing to the extra packing costs.

The remedy therefore for the Pharmacist who is troubled by variations in the density of the Bismuth Carb. he uses, is to stipulate **HOWARDS** when ordering, stating at the same time the density required: 32, 50 or 80 fluid ounces to the pound.



IT COSTS NO MORE
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AN OPEN LETTER FROM

Dr. Singha

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For the past three years Dr. Singha's Asthma Cure has been used by sufferers from Chronic Asthma and Bronchitis with the utmost success. Regular users number many thousands, all of whom will welcome the facility which the profession can offer them of obtaining a quick supply service right in their own town during all shopping hours.

Pharmacists are reminded that there is only one genuine and original Indian Formula and that every authentic package bears the facsimile signature of Dr. Singha. There is, therefore, no substitute for Dr. Singha's Asthma Cure, which gives the best, uickest and surest results.

A generous scheme of press advertising comprising the big National Daily and Sunday papers is informing the public that supplies can now be obtained from all chemists, and your co-operation is earnestly solicited to ensure that a stock, even if small, is ready to meet the demand which is already present and which will be doubled in the course of the next six months with your assistance and courtesy.

If you have not already got a supply please place a stock order with your usual Wholesaler without delay. Dr. Singha's Asthma Cure does not deteriorate in stock. It gives you a handsome profit for selling and repeat orders will encourage you to recommend this effective specific on its merits.

Order only through your usual Wholesale House.

P.A.T.A. PRICES

3/- bottle	**27/-**	per dozen	
5/- ,,	**45/-**	,, ,,	
12/- ,,	**108/-**	,, ,,	
20/- ,,	**180/-**	,, ,,	

Special Child's size.
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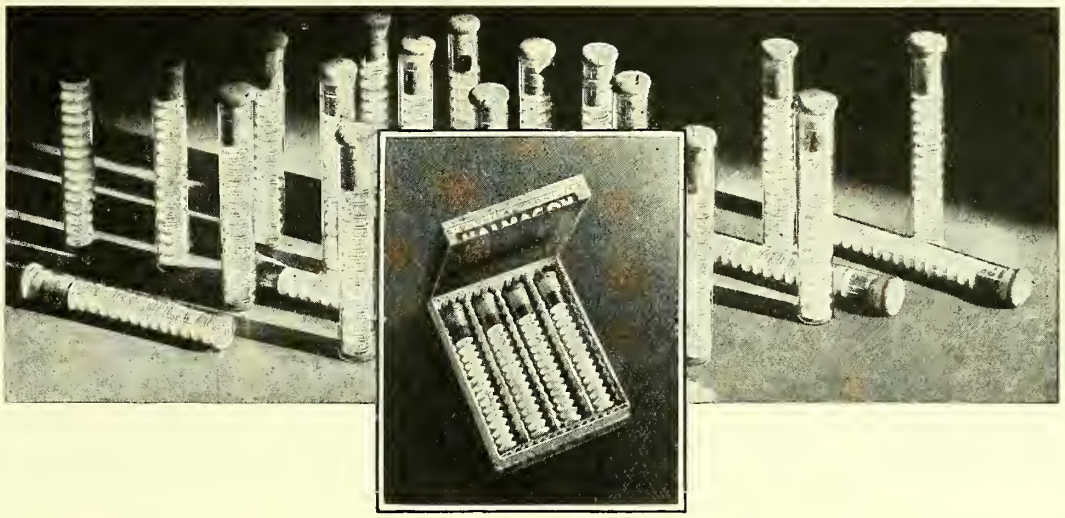
8/- ,, **72/-** ,, ,,

Packed in Cartons.

Further particulars gladly supplied by the Sales Manager.

The Dr. Singha Co. Ltd.,
Caernarvon, G.B.



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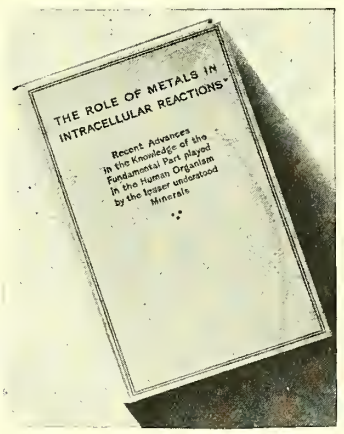
THE fact that the human body requires minute quantities of metals for its effective functioning is being increasingly recognised, and this new product, of special magnesium compounds, has been issued to meet this requirement. Extensive propaganda has been undertaken to acquaint the medical, dental and veterinary professions with Halmagon preparations.



Every chemist should read the book "The Role of Metals in Intracellular Reactions," which contains an absorbingly interesting account of modern views on the requirements of the body for the efficient functioning of its organs. A copy of this book has been sent to every qualified chemist, together with a postage-paid card, on receipt of which the manufacturers will forward a specimen box of Halmagon Brand Tablets. No chemist should fail to avail himself of this opportunity. Qualified chemists who have not received this book may obtain it, post free, on request. The same offer is made to any assistant who is not yet qualified.

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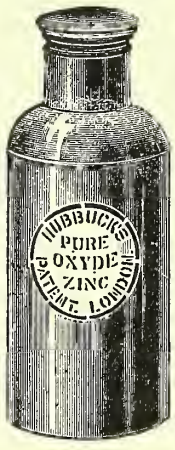

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Telephone : SLOUGH 608

'ASPRO' consists of the purest Acetylsalicylic Acid that has ever been known to Medical Science, and its claims are based on its superiority.

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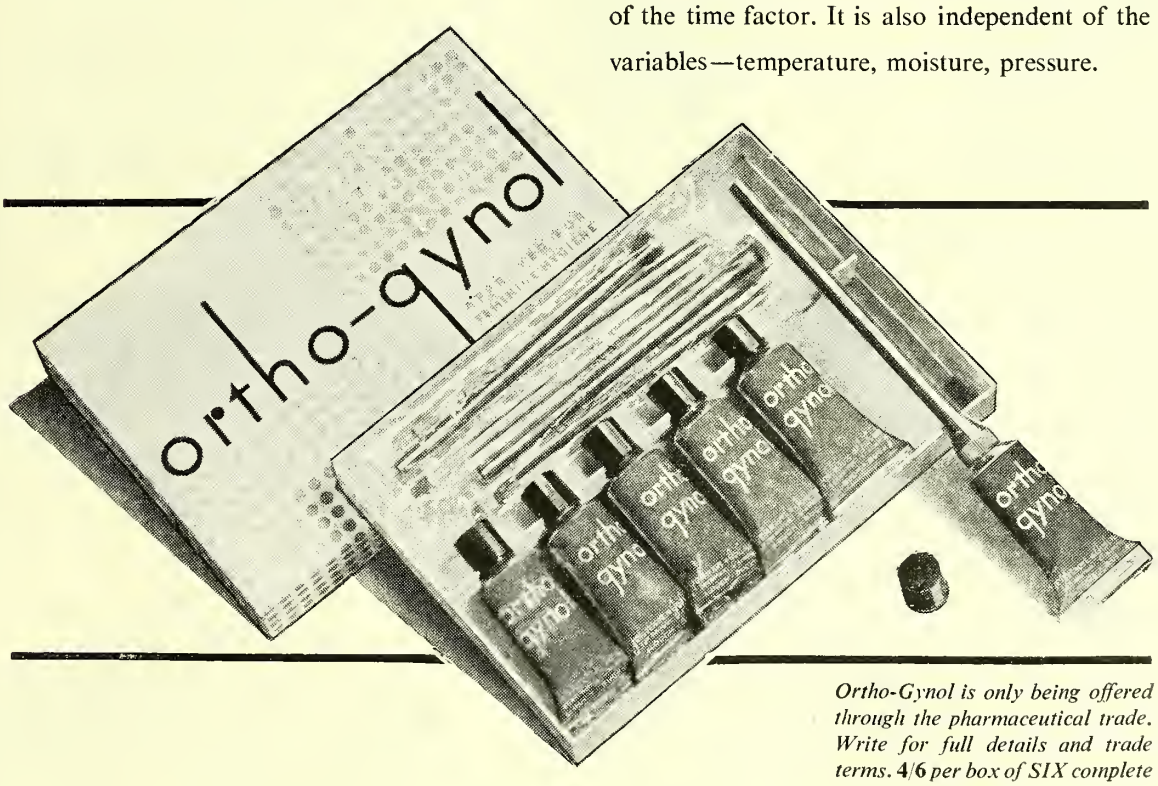

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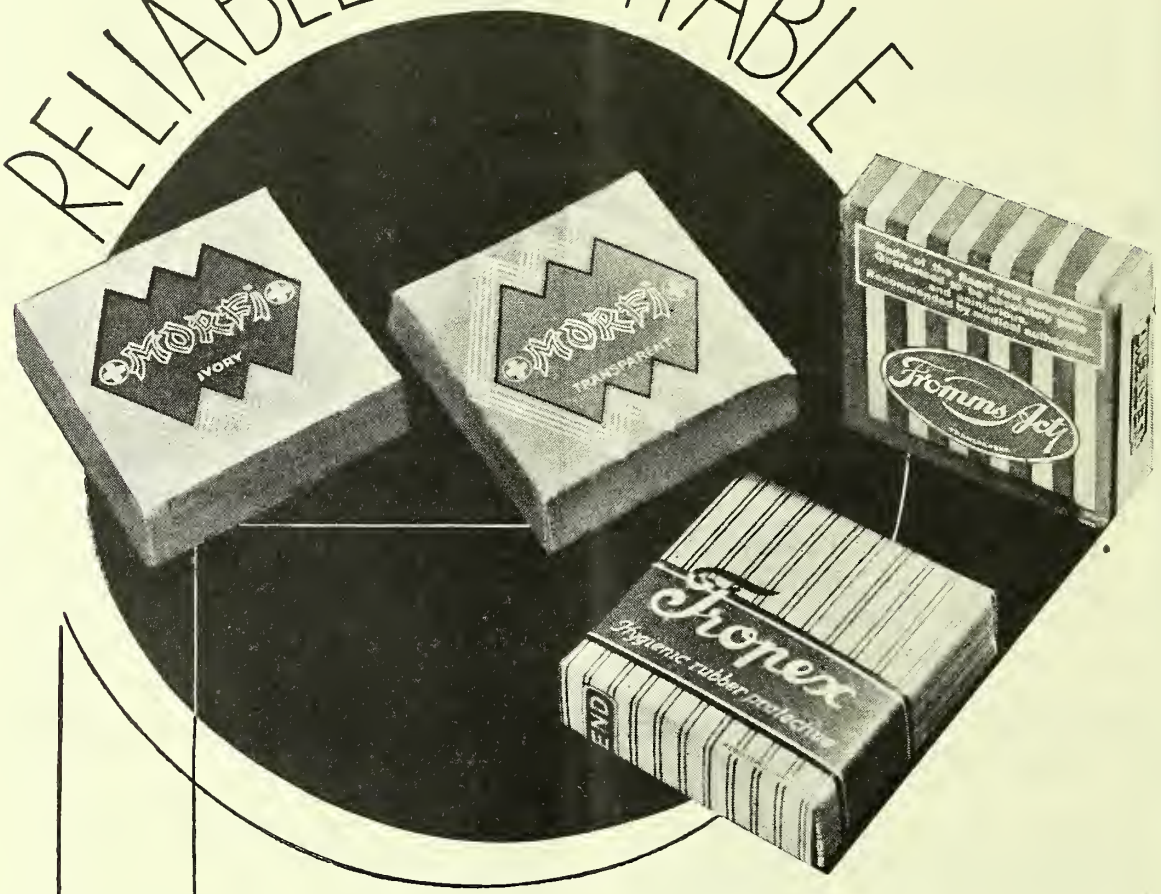

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The CHEMIST AND DRUGGIST SUPPLEMENT

This Supplement is inserted in every copy of The Chemist & Druggist

28 ESSEX STREET, LONDON, W.C. 2

JULY 21, 1934

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2.—HAMPSTEAD (NEAR).—High-class retail business situate in excellent position; returns this year approximately £2,000; lock-up shop; reasonable rental; long lease; price £1,250 or near offer.

3.—LONDON, S.W. SUBURB.—Middle-class family retail business; increasing turnover, last year £1,920; gross profit £669; excellent living accommodation; garden; rent £60 per annum; lease; price £800, plus stock at valuation, in all about £1,150.

4.—WALLINGTON (NEAR).—Good-class business, situate in excellent position; increasing turnover; present rate about £30 per week; good profits; double-fronted modern shop fitted in fumed oak; vendor owns premises, and would sell same or grant a lease at a reasonable rental; price of business only £1,000.

5.—ESSEX (SUBURBAN).—Middle and working-class main-road cash retail business; net profit over £800 per annum (chartered accountants' figures); good living accommodation; reasonable rental; long lease; price about £1,800, or valuation terms entertained.

6.—MONUMENT (NEAR).—Usual city business; established 1803; average turnover £45–£50 per week; stock and fixtures worth £1,050; rent and rates £250 per annum; price £1,650 or near offer.

7.—UXBRIDGE (NEAR).—General retail business situate in excellent position; returns under management over £30 per week, increasing; stock and fixtures worth £700; price £1,100 or near offer.

8.—HOME COUNTY.—Cash retail business with side lines conducted under the management of a lady; net profit £500 per annum; reasonable rent and lease with excellent sublet; price £1,025 or near offer.

9.—KENSINGTON (NEAR).—Main-road cash retail business, with N.H.I.; returns £38 per week, inclusive of N.H.I.; accountant's figures; prominent position; advantageous sublets; further details on application.

10.—CATFORD (NEAR).—Main-road cash business, with small optical connection (about £50 per annum); established 1822; returns £1,400; low rental; price £600; genuine reason for sale.

11.—PLYMOUTH (FEW MILES FROM).—Middle-class family retail business; established 1884; net profit exceeds £600 per annum; good living accommodation; property could be purchased for £1,000; rent £60 per annum; price £1,650.

12.—CORNWALL.—General retail business with Kodak agency; returns £2,350; good profits; net rent £78 per annum; long lease; further details to genuine buyers.

13.—HENLEY (NEAR).—Good-class family retail business with small optical connection; established 50 years; audited returns; net profit for income tax purposes £500 per annum; accommodation; rent £70 per annum; lease 14 years unexpired; price £1,250.

14.—NORTH OF ENGLAND.—Drug store with wine and spirit licence (separate entrance); combined turnover over £3,000 per annum; net profit £700; price all at £1,200.

15.—SURREY (NICE LOCALITY).—Good-class business, much neglected; returns exceed £1,600; good living accommodation; will be redecorated; long lease; price for immediate sale, £1,000.

16.—EASTBOURNE.—Drug store with Kodak agency; returns £1,095; net profit £212; single-fronted shop; rent 25s. weekly inclusive; price £575; scope for considerable increase.

17.—REIGATE (NEAR).—Business and branch for disposal; in present hands 30 years; post office attached to each; good living accommodation; vendor retiring; further details on application; purchase price in the neighbourhood of £1,900.

18.—DERBYSHIRE.—Light retail business; returns £1,321; good prices; rent £52 per annum; stock and fixtures worth about £600; first reasonable offer will be accepted; part payment would be entertained; £400 down.

19.—SUFFOLK COAST.—Good-class dispensing business, with photographic; returns £1,890; good house; double-fronted shop, well fitted and stocked; price to be arranged.

20.—HOME COUNTY (BUSY TOWN).—Main-road cash retail business; returns approximately £2,300 per annum; net profit £600; stock and fixtures worth £1,100; price £1,700 all at, or £600 plus stock and fixtures at valuation.

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(C3) SOUTH LONDON SUBURB.—Mixed business, with wine licence; turnover upwards of £5,000 per annum; gross profit about 33⅓ per cent. on returns; rent £350, plus rates; price £2,100, including stock, £1,000.

(C4) BIRMINGHAM.—Old-established pharmacy and optical business for disposal owing to retirement; turnover approximately £3,500; lock-up shop; price £3,000, including stock approximately £1,400.

(C5) KINGSTON-ON-THAMES (NEAR).—Established retail business, with living accommodation; average turnover approximately £1,700 per annum; good scope for further increase; no near opposition; price £1,000 or offer.

(C6) LONDON, N. (OUTER SUBURB).—Attractive modern pharmacy, with living accommodation, situated in good-class residential district; turnover £1,800–£2,000 per annum; property also available; well recommended.

(C7) BLACKPOOL.—Lock-up pharmacy, with abundant opportunities for increase; average turnover approximately £1,300 per annum; reasonable rental; price £550 (value of stock and fittings only).

(C8) LONDON, N.—Pharmacy, with living accommodation, offering good scope for considerable development; turnover for 1933, £1,117; very low rental; price £500 all-at.

(C9) STAFFS.—Old established business for disposal owing to death circumstances; turnover approximately £1,850 per annum; extensive living accommodation, with large garden; reasonable overheads and purchase price.

(C10) NORTHANTS.—Established retail business showing present returns of approximately £35 per week, with scope for further increase; rent £60; price about £950.

(C11) BUCKS.—Attractive modern pharmacy, with excellent labour-saving flat above; turnover approximately £25 per week; rent £100 per annum, on lease, or freehold could be purchased; genuine reasons for disposing; price £700 or near offer; admirably suited to elderly chemist desirous of semi-retiring; business situated in very congenial good-class residential district.

(C12) LONDON, E.—Main-road pharmacy, with heavy N.H.I.; turnover approximately £1,150 per annum; low rental; living accommodation; price £600 all-at.

(C13) VICTORIA (NEAR).—Lock-up pharmacy, situated in busy thoroughfare; present returns about £18 per week, with abundant scope for development; reasonable purchase price, amounting to little more than the value of stock and fixtures (approximately £375).

(C14) SUSSEX.—Pharmacy, situated in leading position of congenial seaside town; average turnover approximately £1,335 per annum, with definite scope for early substantial increase; price £600, part of which could remain; exceptional opportunity.

(C15) FARRINGDON ROAD (NEAR).—Established business with large N.H.I., can be acquired at a "bargain" figure for a quick sale; net profit for 1933–34, £243; very low rental; excellent scope for substantial increase; price £400 all-at, including stock £250.

(C16) TWICKENHAM (NEAR).—Modern pharmacy, with excellent potentialities, for disposal owing to genuine circumstances; average turnover approximately £1,900 per annum; rent £135, including up-to-date house, with three bedrooms, etc.; no near opposition; price by arrangement.

(C17) WHITECHAPEL (NEAR).—Established retail business, situated in busy main thoroughfare; turnover approximately £1,240 per annum; net profit £350; reasonable rental; £300 will purchase; stock (optional) in addition; well recommended to chemist desirous of purchasing an East End business.

(C18) BARKING.—Pharmacy, with living accommodation, including garage; turnover for last financial year £1,361; good scope for further increase; very reasonable overheads; price £700, including stock £400.

(C19) LONDON, W.—Exceptionally good profit-earning business, with excellent scope for further increase; average turnover approximately £1,700 per annum; low rental, which is covered by income from sub-letting; living accommodation available if required; price by negotiation.

BUSINESSES FOR DISPOSAL.

s. for 50 words or less ; 6d. for every additional 10 words or less, prepaid. (Box No., 1s. extra.)

ALFRETON, DERBYSHIRE.—*Re* C. H. Reid in Bankruptcy. For Sale by Private Treaty, the Old-etablisbed Cbemists' Business n main position; low price; the premises, wbicb bave living accom-nodation, can be taken on lease at a fair rental; busy industrial rea. Particulars, Artbur Robinson, F.A.I., Auctioneer, Cbester-eld.

BIRMINGHAM Suburb.—For quick sale, medium-class Cbemist's Business; good bouse, garden, garage; Kodak Agency; enuine reasons disposal; excellent main-road position; prospective uyers only; any reasonable offer. 243/742, Office of tbis Paper.

KENT COAST.—Drug Stores; double-fronted sbop; well fitted; Kodak Agency; turnover £700, could easily be doubled by ualified man; rapidly growing district; bouse and garden; for ale, freehold, including fixtures, fittings and goodwill, £1,000; tock at valuation; or would let on lease at £75 per annum; all n £350; owner giving up business. 103/2, Office of tbis Paper.

LIVERPOOL.—Very old-establisbed Business in thickly populated working-class district; no opposition; good casb trade and N.H.I. (both increasing under management); accountant's figures; D. and P. witb good connection, Wbolesale and Retail; good bouse; ow rental and overhead expenses; a rare bargain for working roprietor; owner giving up owing to ill-bealtb. 104/28, Office f this Paper.

LONDON (Essex Suburb).—Genuine Medium Light Cash Retail, good Panel and Pbotograpbic Business; Kodak and Rexall gencies; returns last year £1,360, increasing; audited accounts; ong lease; modern Pharmacy, witb living accommodation and arage; upper part could be let; goodwill, fittings and fixtures 300; s.a.v., about £350. 104/42, Office of tbis Paper.

LONDON, S.W., main road; turnover last 3 years average £1,100; run as Drug Store past few years; genuine business; cope for big increase under personal qualified management; long ease; standing low rent; present owner retiring from business; 700 or near offer. 104/50, Office of tbis Paper.

PORTGORDON, BANFFSHIRE.—Mixed Business for Sale; net profit averages £300 last 4 years; price about £650 or offer; good living accommodation available. Particulars from Webster, Cbemist, Portgordon.

SOUTH WALES Industrial; old-established; lock-up; Gen. Retail; N.H.I., Med. Wine, Pboto, &c.; rent £60, rates £23; returns ver £2,000; price £850, or £100 plus S. and F. valuation; a ound investment for active man; owner giving up. "Salix," 96/2, Office of tbis Paper.

SUSSEX COAST.—Lock-up Pharmacy, centre town; has been under Unqualified management and neglected; scope for Qualified an with personality; certified returns, witb Optics, average £2,800 approx. for last 5 years; valuation terms or offer. 105/17, Office of this Paper.

S.W.—BEST position in main tboroughfare at present; purely Dispensing, Prescribing, good-class Fancy, Pbotographic, &c.; no N.H.I. Excellent opportunity for much increase; well fitted witb ample and every convenience; lock-up; 11 years unexpired easy lease; non-repairing; minimum overbead expenses; reasonable rent; minute overbead; Tube, bus, &c. 104/46, Office of this Paper.

BARGAIN £85.—Nice compact old-established Pharmacy, now a Drug Stores, P.D.A.; living accommodation; can be sublet; lease with option of renewal; electric, tap, sink, all equipment, stock, fittings, fixtures, sunblind, &c.; suit young Qualified; owner has otber interests. 94 Torriano Avenue, N.W.5.

BUSINESS neglected under management; a very promising position for an enterprising Pbarmacist; total outgoings (rent, rates, &c.) 30s. a week; owner, having other interests, will consider any reasonable offer. Telepbone Buckhurst 3094 or Write "L.," 125 Higb Road, Salway Hill, Woodford Green, Essex.

CHEMIST'S Brancb Business for Sale; takings small under management, but good scope for increase with young Qualified man with some push; lease granted (vendor's own property); offered on exceptional terms to suitable buyer; about £250 required; serious applicants please write for furtber particulars. 105/12, Office of this Paper.

CHEMIST'S Business for Disposal, Liverpool; well-stocked and fitted lock-up sbop in thickly populated district; rent £65 per annum clear; takings approximately £20 per week; capable of increase; low price. For furtber particulars apply, Parkin S. Bootb, Certified Accountant, 2 Bixtetb Street, Liverpool.

IMMEDIATE Sale, Dispensing and Photograpbic Business, N.W. London; lock-up; suit young Qualified; very low overheads; profits under management £4 15s. per week; ample scope; must sell; take price of stock and fixtures, £240; bank references required. 245/793, Office of tbis Paper.

£300.—KENT COAST; lock-up shop; rent £35; Kodak and Selo; turnover £900; splendid opportunity; selling owing to lack of capital; 15 years' lease. 245/792, Office of tbis Paper.

BUSINESSES WANTED.

REQUIRED immediately by Limited Company, witb substantial capital for early investment, a large number of Businesses, where audited accounts for the past tbree years are available; good prices will be paid for suitable propositions and negotiations can be entered into witbout delay, subject to satisfactory figures being fortbcoming. Please write in tbe first place, under guaranteed assurance of confidence, to Ernest J. George & Co., 329 Higb Holborn, London, W.C.1. Telephone No.: Holborn 1167.

PREMISES TO LET.

ILFORD.—Shop, with living accommodation, to let on lease, suitable for Chemist; tbickly populated district; reasonable rent. Apply Graves, 70 Cranbrook Road, Ilford.

MARYLEBONE CIRCUS.—Particularly fine Half Shop and large Mezzaniue Floor to let at low commencing rent. Sole Agents, Hillier, Parker, May & Rowden, 27 Maddox Street, W.1. Mayfair 7666.

LEASE FOR SALE.—Prominent corner sbop; rent £200, inclusive; Nortb London; modern front; ideal for Chemist; adjoining station and super cinema. Write P.C.B. 127/30, Office of tbis Paper.

TO LET.—Recently completed Shop Premises available for Chemist; giving opportunity to supply 2,000 residents in growing district; no similar business witbin one mile. 'Phone for particulars, Perivale 1446.

TO Multiple Firms and Otbers: Reigate.—Facing the Market Square, prominent Modern Premises witb sbowrooms and dwelling flat; 20-ft. frontage; to be let on lease. Watkin & Watkin, Reigate (Tel. 330).

PREMISES FOR SALE.

N.W.4 DISTRICT.—Lease for disposal; 5½ years to run, option of furtber 7 or 14; weekly overheads 38s. per week; lock-up shop, double fronted; usual conveniences; very suitable for Drug Stores or Qualified; nominal figure asked; view by writing. 140 Minet Avenue, N.W.10.

APARTMENTS.

WHEN YOU COME TO LONDON STAY AT THE HAMPDEN RESIDENTIAL CLUB.

FOR GENTLEMEN, Hampden Street, N.W.1. Close to King's Cross and Euston. 300 bedrooms. 12s. 6d. to 25s. per week, including baths, attendance and boot cleaning. All meals à la carte in dining room. Moderate tariff. Large Club Rooms, Library, Billiards Room, Reading Room and Study for Students. Illustrated Prospectus from Secretary. Euston 2244/5.

AGENCIES.

AGENTS with connections among Doctors and Hospitals, to introduce Infra-Red Apparatus, &c.; wide exclusive territories granted to capable Salesmen; car owners preferred, but not essential; generous commission terms. This apparatus bas no competition, and there are no objections to carrying otber lines. P.C.B. 127/29, Office of this Paper.

MR. S. ASHER, of Asher's Pbarmacy, Ltd., Johannesburg, Soutb African Cbemists, Druggists and Wbolesale Distributors, will be in London during July, and can be interviewed at Messrs. Ewing & Co., 73/4 Chiswell Street, London, E.C.1. Mr. Asher will be pleascd to meet manufacturers witb a view to Buying and Representation for bis organisation in the Union of Soutb Africa and Rhodesia. They bave distributing Wbolesale Depots in Jobannesburg, Cape Town, Durban, Port Elizabetb, East London, Bulawayo and Salisbury.

OLD-ESTABLISHED French Firm of Manufacturers of Pbarmaceutical Products, witb extensive connections in France and abroad, is ready to take up the representation and distribution of first-class, well-known English Medicinal Preparations. Having a modern well-equipped factory, whole or partial manufacture and packing of the products can be undertaken if required. Complete and effective selling organisation available. Write in first instance to 86/4, Office of tbis Paper.

OLD-ESTABLISHED Firm of Commission Merchants in Switzerland, well-introduced in Cbemical Factories and the Drug Trade, desires Agencies of first-class British firms and manufacturers for Cbemical, Pbarmaceutical and intermediate products and drugs (no proprietary or patent medicines). Write to ciffre J 55394 Q to Publicitas, Basle (Switzerland).

PARTNERSHIPS.

BIOCHEMIST desires meet London someone with good knowledge of Executive Salesmanship, for whole, part time or advisory assistance, to develop an ethical proprietary, with sound local sale. 245/795, Office of this Paper.

APPOINTMENTS.

EGYPTIAN GOVERNMENT.

PUBLIC HEALTH DEPARTMENT.

APPLICATIONS are invited for the post of Chief Chemist in the Public Health Laboratories, Cairo.

The post of Chief Chemist is a distinctly responsible one, and the candidate should have sufficient experience to assume the responsibilities of a Public Health Chemical Laboratory and control its working.

The Chemical Laboratory forms part of the Public Health Laboratories, and the Chief Chemist will be responsible under the Director or the Deputy-Director. It undertakes the analysis of foodstuffs, drugs, and medicinal preparations, &c., and the investigation of chemical questions bearing on public hygiene.

The Water Sub-Section carries out all investigations relating to the chemistry of water and sewage.

The candidate should possess academical degrees in chemistry and a good knowledge of general chemistry and have varied and thorough experience in the analytical methods.

He should have practised chemistry in recognised institutes for a period of not less than ten years.

Preference will be given to applicants who have occupied a university teaching post or a post of public analyst, and those who have had experience in laboratory administration and have carried out and published original works in the above-mentioned branches of chemistry.

Age should not exceed 40 years.

Salary will be between 648 and 840 Egyptian pounds per annum, to be fixed in accordance with the educational qualifications and past experience of the candidate.

A monthly deduction varying from L.E.4.290 m/ms to L.E.5.390 for stamp duty will be made from the salary due.

No increments are granted and no private practice is allowed.

Conditions of appointment, which will be for a period of three years, may be obtained from the Royal Egyptian Legation, Bute House, 75 South Audley Street, London.

Applications stating age, qualifications and past experience, and accompanied by copies of recent testimonials, should be addressed, before the elapse of two months after date of issue, to H.E. the Under-Secretary of State, Department of Public Health, Cairo. The selected candidate will be expected to take up his duties as soon as possible after appointment.

ROBERT GORDON'S TECHNICAL COLLEGE,
ABERDEEN.

WANTED, Assistant Teacher for the School of Pharmacy; salary £250 to £300 or more, according to qualifications and experience of applicants. The salary will be subject to a deduction of 2½ per cent. or such other rate as the Governors may from time to time determine. Preference will be given to candidates with the Pharmaceutical Chemist or the Degree of Bachelor of Pharmacy qualification. Additional qualifications in Biology will be a recommendation.

The successful candidate, who will be required to pass a medical examination, will enter upon duty on 25th September, 1934, or as soon as possible thereafter.

Applicants should lodge with the undersigned on or before 18th August 15 copies of a letter of application stating age and giving full particulars of their education, training and experience, together with 15 copies of three recent testimonials and names of three other persons to whom reference may be made.

JAMES MACKENZIE,
Secretary and Registrar.

Robert Gordon's Technical College,
Aberdeen. 17th July, 1934.

APPRENTICES.

APPRENTICE.—There will be a vacancy about the middle September for an intelligent girl as Apprentice, preferat having passed Part I. Apply by letter, or personally after 10. a.m., Miss Aked, 6 Palace Court, Finchley Road, N.W.3.

SITUATIONS OPEN.

RETAIL (HOME).

6s. for 40 words or less ; 6d. for every additional 10 wor or less, prepaid. (Box No., 1s. extra.)

LLANDUDNO.—Lady Assistant, Unqualified, competent, wit good Dispensing, Photographic and Counter experienc wanted. Apply, stating age, height, experience and salary r quired, with photograph, Miss Horniblow, 4 Queen's Building Llandudno.

LONDON, E.—Qualified Assistant; middle-class district; N.H. and Cash Retail; give full particulars of experience, nam of references, when disengaged, age and salary required. App (letter only), Chemist, 115A Stoke Newington Road, London, N.1

LONDON, E.—Qualified Assistant required for brisk N.H.I. Di pensing and Counterwork; about 30-40; capable taking charg when required; please state age, height, if disengaged; moderat salary; permanency if suitable; interview. Or Locum desirin permanency later. 105/8. Office of this Paper.

LONDON, N. (near Finsbury Park).—Qualified Locum, chiefly fo N.H.I. Dispensing and Counter Work from September 3 to 1 inclusive. Please state age, salary and experience to 104/40, Offic of this Paper.

LONDON, S.W.13.—Young Qualified Assistant, either sex, wanted second and third weeks August or third and fourth week Write or call, Meads Pharmacy, 198 Castelnau, Barnes, S.W.13.

MANCHESTER.—Capable experienced Assistant required; goo salary and prospects offered to suitable applicant. Apply stating age, experience and full particulars, to 103/6, Office of thi Paper.

MANCHESTER.—Locum, August 6 to 18; Qualified; working-clas district; elderly would suit if terms reasonable. 103/5 Office of this Paper.

MANCHESTER.—Qualified Assistant required; good Window dresser, obliging Counterman, Photography, N.H.I.; working class; good references; salary required. Apply 105/16, Office o this Paper.

MANCHESTER.—Qualified Chemist required; working-class dis trict; good Counterman, Window-dresser, accurate, quick Dispenser for N.H.I.; state full particulars, salary, &c.; permanency Tomlinson's (Manchester), Ltd., 21 Embden Street, C-on-M. Manchester.

MANCHESTER.—Qualified, honest and of pleasant appearance and disposition, as Assistant; pleasant locality; state experience, age, previous employer and lowest wage acceptable (possibility of increase later); recent photograph preferred. 245/785, Office of this Paper.

MIDLANDS.—General Manager required by private firm of Multiple Chemists; send photograph and state previous experience, age, height and salary required (no accommodation). 104/39, Office of this Paper.

MIDLANDS.—Qualified Locum required for three weeks from September 3; applicants please state salary required (to live out) and enclose references and photograph. 245/797, Office of this Paper.

MIDLANDS.—Unqualified Assistant wanted; permanent; middle-class business; Counter and Dispensing; applicants please state salary required (to live out) and enclose references and photograph. 245/798, Office of this Paper.

N. EAST LANCS TOWN.—Qualified Assistant (22-25), outdoors; energetic, smart appearance; good Window-dresser, knowledge of Photography; apply with full particulars and salary required; applications unanswered in few days respectfully declined. 103/11, Office of this Paper.

NEAR MANCHESTER.—Qualified Man for light work; good Counterman and Window-dresser; state wages required (moderate for commencement) and usual requirements; will be wanted for August 14; replies not answered within 7 days kindly declined; no stamped addressed envelopes. 103/10, Office of this Paper.

NEWQUAY, CORNWALL.—Wanted immediately, Unqualified Assistant for the Season. Apply, with full particulars and salary required, to Varleys, Ltd., 38 Cliff Road.

SOUTH LONDON.—Required immediately, Qualified Assistant, whole or part time; would suit elderly gentleman if active; duties chiefly N.H.I. Dispensing. Reply, giving full particulars of experience, age and salary required, "Unguentum," 104/52, Office of this Paper.

SOUTH STAFFS.—Assistant wanted (male); must be good Dispenser and quick at Counter; age not more than 35; applicants must state salary required (to live out) and enclose photograph and references. 244/779, Office of tbis Paper.

EXPERIENCED Unqualified Assistant required immediately; permanent position; must be conscientious worker and good Salesman possessing sound knowledge of modern Toilets; West End experience an advantage, but not absolutely essential. Apply (letter only), giving full particulars, height and salary required, to Coomer & Richman, Ltd., Chemists, &c., Argyll Street, W.1.

HARRODS, LTD., require a Saleswoman for their Surgical Department; first-class experience in fitting hose and belts essential. Apply personally to Staff Controller, 44 Hans Crescent, S.W.1, before 11 a.m.

LADY Assistant, Qualified or Unqualified, for Sussex coast business within the next few weeks; permanent; required for Dispensing, Counter and Windows. Reply, witb particulars of experience, salary, age and photo if possible, to R. Lindsay, The Arcade, Littlehampton.

LADY Dispenser required immediately, or Locum; good Counterhand; permanency. Apply 4 Crawford Street, W.1.

LOCUM (Male), August 13, for 3 weeks; S.W. London district. Full particulars to 106/3, Office of this Paper.

LOCUM, Qualified, for 2 weeks from August 13; experienced Assistant kept, so man recently qualified acceptable. Harvey, 3 Beeches Avenue, Carshalton. 'Phone: Wallington 2223.

LOCUM, Qualified, Lady or Gent., for Camberwell, S.E., for one montb, from about the middle of August; usual middle-class Retail. Particulars to 245/795, Office of this Paper.

LOCUM, Qualified, Lady or Gentleman, required; August 11 or 13 to August 18, inclusive; Assistant kept. State full particulars and salary to Thomas, Chemist, 264 Cheam Common Road, Worcester Park, Surrey.

LOCUM, Qualified; single-handed; outdoor; August 20 to September 1, inclusive. Terms and references to Wavell, Chemist, 241 London Road, Mitcham, Surrey.

LOCUM, Qualified, wanted for September 8 to 22, inclusive. Also Unqualified Locum for August 13 to 27, inclusive. Apply, with full particulars and salary required, to W. Clapham, Ltd., 240 Lightbowne Road, Moston, Manchester, 10.

LOCUM, Qualified, young; wanted August 20 to September 1 or August 26 to September 8; state age, experience, references; letters only. Mylroi, 61 South Parade, W.4.

M.P.S., JUNIOR (single), for country Pharmacy, wanted immediately; state terms; permanency if suitable. 245/790, Office of this Paper.

M.P.S.—WANTED at once as Superintendent to small limited company in Essex; light N.H.I.; easy post. State salary required, which must be moderate, to 103/27, Office of this Paper.

M.P.S.—WANTED, early in August, Pharmacist, Lady or Gentleman; London, S.E.; excellent opening; under 30 years. Full particulars to 104/8, Office of this Paper.

QUALIFIED Assistant required immediately for branch; duties mainly Dispensing. Full particulars to A. & N. Catto, Ltd., 49 Cranbrook Road, Ilford.

QUALIFIED Assistant; smart appearance; good Counterman and Window-dresser; for London, W.1. Write, stating age, experience, salary required and when free, 105/7, Office of this Paper.

QUALIFIED Assistant wanted August 6; must be quick and accurate Dispenser; state salary and experience, references, etc. Best Ewell Chemist, 17 High Street, Epsom.

QUALIFIED Assistant with good Dispensing and Counter experience. Apply J. V. Hall, 818 Finchley Road, Golders Green.

QUALIFIED Branch Manager (30-40); South Yorkshire; start July 30; live out; good Salesman and Display; full particulars of salary required and references. 104/18, Office of this Paper.

QUALIFIED Junior for high-class Dispensing and Photographics. Send photo and references and state salary required, W. R. Selleck's Successors, 136 High Street, Stourbridge.

QUALIFIED Locum required, Lady preferred, for S.E. district, from July 30 to August 11, inclusive; possibility of permanency later. 104/20, Office of this Paper.

QUALIFIED Locum wanted for East London district from August 13 to August 25 inclusive. Apply, with references, terms, &c., to 104/35, Office of tbis Paper.

QUALIFIED Locums wanted for following periods (Birmingham district); August 13 to 25, August 27 to September 8, September 3 to 15; state which periods disengaged and full particulars, including salary. 104/30, Office of this Paper.

QUALIFIED Manager for branch shop; to commence at once. State salary, age, with references, to D. F. Jenkins, c/o A. Ll. Williams, Ltd., Bush Street, Pembroke Dock.

QUALIFIED Relief Managers required for the summer season; Applicants must be well up in Modern Pharmacy, capable of control, energetic and live business men; good salary and commission; permanencies will be offered to competent men. Apply, giving age, full particulars of experience and salary required, to Staff Manager, Timothy Whites, Ltd., Chemists, Portsmouth.

QUALIFIED, young, married man, required to take charge of Pharmacy and Hardware Business in Midland town; house attached; knowledge of Post Office work advantageous. State full particulars and salary required to 103/8, Office of this Paper.

SENIOR Assistant (age 24 to 30); must be good Display Artist and used to N.H.I. Dispensing. Junior Assistant also wanted. Apply, with usual particulars, to Bowen & Williams, 63 Golborne Road, London, W.10.

SMART Qualified Chemist for Birmingham suburb; courteous Salesman, good Prescriber; state lowest salary and when can commence. 105/9, Office of this Paper.

SMART Qualified Lady required for North Staffordshire District; knowledge of Toilets essential. Full particulars, experience, salary required in first letter, to 102/2, Office of this Paper.

SMART Young Qualified Assistant for Becontree Estate; must be used to brisk Counter and Dispensing; moderate salary to commence; please submit full particulars in first letter; those unanswered in 7 days respectfully declined. Apply 105/3, Office of this Paper.

UNQUALIFIED Assistant (about 24); accurate Dispenser; from August 7 to 14; part time by arrangement or whole. Apply 103/23, Office of this Paper.

UNQUALIFIED Assistant required for West End Pharmacy; hours 1 p.m. till 12 p.m. and every alternate Sunday from 4 p.m. till 11 p.m.; one full day a week off; one with usual West End experience preferred; give particulars and salary expected. Apply 245/787, Office of this Paper.

UNQUALIFIED Assistants required for the summer season; applicants must be well up in modern Pharmacy, energetic and live business men; good salary and commission; permanencies will be offered to competent men. Apply, giving age, full particulars of experience and salary required, to Staff Manager, Timothy Whites, Ltd., Chemists, Portsmouth.

WANTED, a Locum for Reading branch, Qualified or Unqualified, August 13-25. Griffin, Chemist, Newbury, Berks.

WANTED.—A Qualified Chemist, capable Dispenser, Window-dresser and keen Salesman; must be thoroughly honest and trustworthy. Write, stating age, salary, experience, when able to commence, to Chemist, 77 High Street, London, N.W.1.

WANTED at once, for short season, smart Assistant for Counter work. Apply Kirkland, Cbemist, New Romney.

WANTED AT ONCE.—Lady Assistant for season; must have had Retail experience; easy hours, no Sunday duty; suit newly Qualified; £3 3s. Apply, stating age, experience, and enclose references, to 105/10, Office of this Paper.

WANTED AT ONCE.—Young Lady or Gentleman Assistant, Qualified or Unqualified, for small Retail and Dispensing Business in Gloucestershire; must be competent Dispenser. Please send full particulars, salary expected and photo if possible to 104/47, Office of this Paper.

WANTED for N.W.6 District, young Unqualified Assistant, Male; must be a reliable Dispenser. Apply, stating height, age, experience and salary required, to "Spes," 103/25, Office of tbis Paper.

WANTED.—Lady for Toilet Department South Yorkshire Chemist; applicant must have had training in the use and selling of Cosmetics with high-class experience in Perfumery buying and stock-keeping. Apply, stating height, age, experience and enclosing photo and references, 245/788, Office of this Paper.

WANTED.—Qualified Lady or Gentleman at once; comfortable berth; permanency; £3 a week, tea and commission. 104/12, Office of this Paper.

YOUNG Lady and Gentleman wanted, Qualified, for branches in Manchester. Reply, stating wages required, experience, &c., and photograph if possible, to 316 Platt Lane, Fallowfield, Manchester, 14.

PHOTOGRAPHS, TESTIMONIALS, &c.

When answering advertisements in this section applicants are strongly advised not to send (unless specially requested) ORIGINAL TESTIMONIALS or VALUABLE PHOTOGRAPHS. As can be readily understood, when an advertiser receives from 100 to 150 replies the task of returning photographs, testimonials, &c., is one of some difficulty.

YOUNG Qualified Lady Chemist required for small business in Sheffield; easy and comfortable post; moderate salary, to which could be added commission; light duties and homely consideration to right person. Apply 106/1, Office of this Paper.

YOUNG Qualified; opening Dispensary Department; write experience and wages. Mackney, 138 Station Road, Sidcup.

WHOLESALE.

LONDON, S.W.—The Manufacturers of the Famous "June" Perfumery Series have Vacancy for First-class Traveller to represent them in South London and West End; liberal terms and excellent prospects to live man with connection; apply by letter only, giving fullest details of age, qualifications, experience, &c. Saville Perfumery, Ltd., Watford, Herts.

A POPULAR Brand of Tablets for Sale through Chemists and Stores. Representatives required to cover Essex and Home Counties; experience and connection essential; salary, commission and expenses to suitable men; those with car preferred; advertising and attractive show matter. Box 953, Smiths', 100 Fleet Street, London, E.C.4.

ASSISTANT Chemist wanted by large Wholesale House in the North; must be thoroughly experienced in the Manufacture of Galenicals and Toilet Preparations and able to draw up matter for and advise re packing of same; Export experience an advantage. Send fullest particulars and remuneration asked to 103/15, Office of this Paper.

CHEMIST-WORKS MANAGER; experienced; able to control staff, required immediately for small London Cosmetics Factory. Apply with full details, P.C.B. 127/39, Office of this Paper.

EXPERIENCED Traveller required by old-established Provincial Drug House; car provided; good prospects for right man; state age, training, experience, business and personal references, salary asked. 104/24, Office of this Paper.

MEDICAL REPRESENTATION.—A Vacancy occurs on the staff of a Leading Firm for a Young Pharmacist to call upon Doctors to introduce Biological and Medical Specialities; applicants need to have had experience in High-class Pharmacy. 245/791, Office of this Paper.

REPRESENTATIVES to carry new non-competitive advertised line; with Chemists, Beauty Salons, Ladies' Hairdressers and Store connection; exceptionally good terms. P.C.B. 127/34, Office of this Paper.

SALESMAN required by growing company, calling on Chemists, Hairdressers and Stores; must have connection; generous commission; write for appointment. 102/4, Office of this Paper.

WANTED.—A Live Representative in the Surgical India Rubber line, with sound connection amongst Hospitals, Infirmaries, Institutions; one who can introduce capital preferred. 244/778, Office of this Paper.

COLONIAL, INDIAN AND FOREIGN.

ITALY.—Qualified Assistant, with Continental experience. Write full particulars, if possible with photograph, 104/51, Office of this Paper.

SITUATIONS WANTED.

RETAIL (HOME).

A.A.A.—A RECENTLY Qualified Chemist, M.P.S., seeks experience in Bristol or Bath districts; at present in a situation, but available on 2 weeks' notice; aged 25; height 5 ft. 11 in.; salary £4 10s.; good references. 104/2, Office of this Paper.

A.A.A.—ASSISTANT (30), Unqualified, desires post; good Dispensing and Counter experience in London, including West End; free any time as business has been sold. Mac, 52 Hillfield Road, N.W.6.

A LOCUM (Refer.) (23); 6 years' Dispensing Retail, Wholesale; free till September 1. Griffiths, 13 Burnley Road, Stockwell.

A QUALIFIED Manager, disengaged, requires position in London or Suburbs as Branch Manager; 20 years' experience. Davies, 109 Alexandra Drive, Surbiton, Surrey.

AS Locum or Temporary Assistant; disengaged August 1; experienced; abstainer; good references. "Chemist," 1 New Road, Southampton.

ASSISTANT; full or part time; competent Dispenser, Salesman; single; 25 years' experience. "Aspirin," 61 Fartown Green Road, Fartown, Huddersfield.

ASSISTANT, Unqualified; experienced Counter and Dispensing; part or whole time; last situation 13 years; disengaged; good references; N.E. London preferred. B., 253 Brentwood Road, Romford.

ASSISTANT, Unqualified; experienced Dispensing, Counter, Photographics; locum or part time; free July 22 to August 14 and August 28 onwards. Write C. G., 2A Yalding Road, Bermondsey, S.E.16.

ASSISTANT, Unqualified; tall; 15 years' London and Provincial experience; good Counterman; well recommended. Statim, 26 Langler Road, N.W.10.

ASSISTANT (22), Part I student; start immediately; thoroughly experienced Retail trade, Photography, Window-dressing Dispensing; 2 years London; absolutely reliable; personality; London area preferred. "Steven," Coastguard Station, Torry Aberdeen.

ASSISTANT (25), Part I, Westminster; expert Dispenser and Photographer; London or suburbs. "Dispenser," 41 Hillcross Avenue, Morden, Surrey.

ASSISTANT (28), single, desires change, capable and experienced Dispenser, with thorough knowledge of Photography and Window Display; well recommended. Dispenser, c/o Bird, 41 Westcroft Square, London, W.6.

ASSISTANT (43), Unqualified; competent Dispenser, Salesman, Photographics; good references; active; locum or permanency. Hill, Greenway, Budleigh Salterton.

BRANCH Manager, Qualified (49); active, progressive; long, successful London/Provincial experience (including single-handed); medium-class; thoroughly recommended; August 13 (ex-locum, London); not married. "Dial," 60 New Road, Brownhills, Walsall.

BRIGHTON.—Part Time required by Final B.Pharm. Student; accustomed Retail and Photographic. Sharp, 49 Edward Street, Brighton.

CHEMIST, young, energetic, accurate Dispenser, Counterman, Window-dresser, requires change, West End or City, as Manager or Assistant; at present in City; studying Biochemistry. Apply P.C.B. 127/35, Office of this Paper.

CHEMIST (46), experienced in all branches of Pharmacy, desires position as Superintendent or Locum; London, Southern Counties or South Coast preferred. "Chemist," 4 Carmarthen Road, Slough, Bucks.

DISENGAGED after August 12 (Unqualified) (42); tall; experienced; can travel immediately; abstainer; undeniable references; locum, permanency. Mack, 18 Aycliffe Road, W.12.

DISPENSER-BOOK-KEEPER, Lady (age 34), requires post urgently; Hall and first-aid certificates; experience with Chemist, Institution and Doctors (private and panel); would assist with other duties; any district in or fairly near London. Miss Thompson, 19 Brandville Road, West Drayton, Middlesex.

DISPENSER, Hall, requires experience in Dispensary, to commence September 1; moderate salary. 104/15, Office of this Paper.

EXPERIENCED Qualified; many years City; permanency; London or near; free shortly. Apply 104/25, Office of this Paper.

LADY Dispenser, Qualified, will give services for few weeks for up-to-date experience. Swale, 44 Hereford Road, W.2.

LOCUM.—One week only, July 29-August 4 (38); experienced, efficient and reliable. R. T. Ridsdale, M.P.S., Blendworth, Horndean, Hampshire.

LOCUM, Qualified; all-round Retail and Hospital experience; free August 1 onwards; Northern England only; terms moderate; good references. "Pharmacist," Cumberland Infirmary, Carlisle.

LOCUM, Qualified; highest references; experienced; August 11 to 18, September 1 to 15. Jenkins, 12 North Parade, Bath.

LOCUM, Qualified; knowledge of Optics; free August 4-12, September 3-17, all October. West, 36 Bore Street, Lichfield.

LOCUM, Qualified; reliable; good varied experience, London and Provincial; good references; disengaged July 23. S. T. Hoskins, c/o Haywards, Ltd., Chemists, Redfield, Bristol.

LOCUM, with first-class experience and excellent references, free from July 30 to August 4 inclusive; Unqualified. C., 7 The Paddock, Chatham.

LOCUM (40), Unqualified; active; well up all branches; Photo, &c.; used to charge; would manage Drug Stores; free August 5 to 20, inclusive; country or seaside; moderate salary. White, 9 Penford Street, Myatts Park, S.E.5.

LOCUM (45), Unqualified; Dispensing, Counter, Photographic, Windows; free until August 13; excellent references. A. B., 2 Walham Grove, Fulham, S.W.6.

MANAGER (Qualified) (25), tall, contemplating change, desires progressive post in similar capacity, or as Senior; experienced in all branches; free in one month. 104/3, Office of this Paper.

NAMES AND ADDRESSES.

When sending advertisements for any of the sections in this Supplement, advertisers—as a guarantee of good faith and not necessarily for publication—should always give their names and addresses. It sometimes occurs that this rule is not followed and delay and disappointment ensue. Strict attention to this detail will be appreciated.

M.P.S. (28), married, desires change; 6 years' experience management; accustomed very heavy N.H.I. and Private and brisk good-class Counter. Advertiser desires permaency offering scope for advancement to a diligent worker. Free ne month. Please state salary offered. 102/8, Office of this Paper.

PHARMACEUTICAL Chemist, middle-aged, disengaged; accustomed management large Wholesale and Retail and control f staff; first-class experience, West End and Provinces; capable rganiscr and Buyer; last position 11 years; change desired. 03/22, Office of this Paper.

QUALIFIED Assistant; free end of September; excellent experience in Counter, Dispensing and Photo; interview in or near ondon. 104/23, Office of this Paper.

QUALIFIED MANAGER (26), 11 years' experience, 3 years' Managerial, desires change; permanency; Lancs preferred, ut not essential. 99/2, Office of this Paper.

QUALIFIED (29), single, relinquishing own business, desires permanency; Agricultural and General Retail and Hospital experience. F. G. Tolman, 43 All Saints Road, Westbourne Park, W.11.

QUALIFIED (38), wide and varied experience, specialised knowledge Photographics, desires Managership. J. Garbutt, 66 laypath, Durham.

RETIRED Chemist; act as Superintendent; relief or light duties. 245/799, Office of this Paper.

UNQUALIFIED Man (43); fully competent in all branches; would take over management with view to partnership. Purdy, Ottery St. Mary.

WOMAN Dispenscr (Hall) seeks post near London; 16 years' experience Dispensing and Counter. Robertson, 100 Alexandra Road, S.W.19.

YOUNG Lady (24), Hall, desires post in South Wales, preferred, but not essential; experienced and reliable. 103/18, Office f this Paper.

WHOLESALE.

AN Accomplished Medical Interviewer and skilled Propagandist, with wide experience and a unique knowledge of Medical Men, their requirements and susceptibilities, desires re-engagement. "Zealous," 21 Gloucester Place, Brighton.

AS Representative, keen Young Man (25); 10 years' experience in trade; Wholesale, Retail; used to hard work. 103/16, Office f this Paper.

CHEMIST Works Manager; experienced in all branches Pharmaceutical, Cosmetic, Manufacture, Formulation, Packing, Display; position sought with progressive company; good administrator and organiser of labour; modern methods for production. 104/13, Office of this Paper.

PHARMACEUTICAL Chemist, with first-class connection Wholesale and Retail, covering over 10 years, wishes to hear from irms requiring Representatives in Northern Ireland and the Irish Free State. 103/3, Office of this Paper.

FOR SALE.

CASH Register, National; in good condition; prints all sales and gives totals of cash, paid outs, and "No Sales"; reasonable price. Write R. Malcolm, 44 Burns Road, Harlesden, N.W.10.

MISCELLANEOUS.

EXCHANGE COLUMN.

FOR DISPOSAL.

FILM Machine, 120 Kodak; almost new; original cost £10; first cheque £2 10s. secures. Craingold, 146 Cheetham Hill Road, Manchester.

MICROSCOPE, with Specimen Slides, for Sale; cost 30s.; would take 15s.; on approval on receipt of 5s. 103/24, Office of this Paper.

WANTED.

WANTED.—Baby Balance; accurate and clean; state make and price. Also Galvanic or Electric Battery. Apply Milnes, Chemists, Southfields, S.W.18.

WANTED.—Chemical Balance and Re-agents for a small laboratory. 245/789, Office of this Paper.

WANTED.—Dispensary Utensils, Dispensing Scales, Counter Scales, Mortar, Measures, Bunsen, &c. R., 309 London Road, Croydon.

WANTED.—Old Earthenware Plaques advertising Rowland's Macassar Oil; Kalydor Aqua Doro. Fortens, 24 Fenchurch Street, London, E.C.

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